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U. S. DEPARTMENT OF AGRICULTURE

EXPLANATORY NOTES

for

FOREST SERVICE

DEPARTMENT OF AGRICULTURE

Fiscal Year

1961

CONTENTS

Project statements -

The obligations shown in the project statements are on the basis of the appropriations and activities proposed in the 1961 Budget Estimates. In some project statements, the activities are further divided into subcategories, reflecting a more detailed description of the work conducted under the appropriation items.

Obligations reflected as subcategories in the project statements, while generally obtained from accounting records, in some instances represent the best approximation available. Wherever it has been necessary to distribute costs to activities for which total amounts cannot be taken directly from the accounts, every effort has been made to allocate such charges as accurately as possible based on other available information such as past experience, special studies, cost analyses, etc.

C O N T E N T S

FOREST SERVICE

Purpose Statement

The Forest Service is responsible for promoting the conservation and wise use of the country's forest and related watershed lands, which comprise one-third of the total land area of the United States. To meet its responsibility the Forest Service engages in three main lines of work, as follows:

1. Management, protection, and development of the National Forests. The guiding principle is "the greatest good of the greatest number in the long run." This requires obtaining the maximum practicable yield and use of the many resources of the National Forests on a continuing basis, to meet both local and national needs--under normal conditions and during times of stress. The 181,000,000 acres of National Forests are located in 41 States and Puerto Rico. About one-third of the remaining saw timber in the country is in the National Forests.

   In managing the National Forests, technical forestry is applied to the growing and harvesting of timber crops. Estimated harvest through timber sales in the fiscal year 1960 is 9.65 billion board feet. Grazing of approximately six million head of livestock is scientifically managed to obtain range conservation along with the use of the annual growth of forage. Watersheds are managed to regulate stream flow, prevent floods, and provide water for power, irrigation, navigation, and municipalities. Management includes the handling of more than 75,000,000 visits of people to the National Forests for recreation purposes. Scientific management is applied to the extensive wildlife resources. Receipts from timber sales, grazing permits, land rentals, and water power permits exceeded $122,000,000 in 1959.

   The protection of the National Forests includes the control of forest fires, which numbered 9,448 in the first eleven months of the calendar year 1959; the control of tree diseases and insect epidemics; and the prevention of trespass.

   The major development activities of the National Forests are reforestation, revegetation, construction of roads, recreational facilities, housing, and other necessary improvements and land acquisition and exchanges.

2. Forest Research. The Forest Service conducts research in the entire field of forestry and the management of forest and related ranges. This includes the growth and harvesting of timber, its protection from fire, insects, and diseases, and the protection and management of watersheds. It conducts studies in forest economics, marketing of forest products, and a survey of the present extent and potential growth and use of the Nation's forest resources. It also conducts research to develop new and improved products from wood and to increase efficiency of utilizing forest products. Results of research are made available to owners of private forest and range lands, to public agencies which administer such lands, to forest products industries, and to consumers.

The Forest Service cooperates with the Agricultural Research Service of the Department by reviewing and appraising for technical adequacy forest research projects beneficial to the United States which are conducted abroad. These projects are carried out with foreign currencies under Section 104(k) of Public Law 480, as amended, and the dollar expenses of the Forest Service in connection with this work are paid from the appropriation "Forest Protection and Utilization."

3. Cooperation with State and private forest landowners is provided by the Forest Service to obtain better fire protection on the 435,000,000 acres of State and privately-owned forest lands and to stimulate development and proper management of these forest lands.

Under the Soil Bank Conservation Reserve Program the Forest Service is responsible for the technical phases of planting trees on land heretofore used for crop production, and for tree seedling production, primarily through the facilities of State forestry departments.

Other work related to forestry includes:

4. Insect and disease control. Under the Forest Pest Control Act (16 U.S.C. 594-1-594-5) and the Lea Act (16 U.S.C. 594a), descructive insect pests and diseases that threaten timber areas are suppressed. Activities include two types of work carried on jointly by Federal, State and private agencies:

   a. Surveys on forest lands to detect and appraise infestations of forest insects and infections of tree diseases and determine protective measures to be taken.

   b. Control operations to suppress or eradicate forest insect pests and diseases, including the white pine blister rust.

5. Flood Prevention and Watershed Protection. On National Forest lands and on non-Federal forest lands within the watersheds authorized for treatment by the Department of Agriculture under the Flood Control Act of December 22, 1944, the Forest Service plans and installs watershed improvement measures, in the form of minor physical structures, cultural measures, and intensified fire control, to retard runoff and reduce flood water and sediment damage. Work on non-Federal land is carried on in cooperation with the Soil Conservation Service and the appropriate State and local agencies.

The Forest Service also cooperates with the Soil Conservation Service, appropriate State agencies and the local organizations sponsoring small watershed protection and flood prevention projects initiated under the Watershed Protection and Flood Prevention Act of 1954, as amended, in planning and installing forestry and related measures on the watersheds and in inter-agency studies of proposed water and land resource developments on river basins for the purpose of obtaining integrated resource development programs.

6. Land Utilization Projects. The Forest Service administers, in accordance with provisions of Title III of the Bankhead-Jones Farm Tenant Act, about 4.3 million acres of Federal land in 67 separate projects, located in 27

States and Puerto Rico. These lands are being managed first to conserve the soil. Resources are being restored and protected and facilities installed and maintained to promote orderly and conservation-wise use of available resources by local people and industries.

7. Work performed for others. The Forest Service is frequently called upon to perform services for other Federal, State, and private agencies on a reimbursable or advance payment basis. Examples of these activities are:

   a. Protection of other Federal and non-Federal forest lands intermingled with the National Forests.

   b. Disposal of slash resulting from sales of timber and the rehabilitation of such areas.

   c. Construction and maintenance of roads, and other improvements.

   d. Research investigations in forest, range, and water management and utilization problems.

   e. Cooperative survey, mapping, administrative, and reforestation projects, etc.

   f. Cooperation with defense and mobilization agencies on forest production and utilization projects, and related work.

The Forest Service maintains its central office in Washington with program activities decentralized to 10 Regional Offices, 127 Forest Supervisors' offices, 801 District Rangers' offices, 9 Forest and Range Experiment Stations, and the Forest Products Laboratory. On November 30, 1959, the Forest Service had a total of 19,937 employees including 569 full-time employees in the central office and 17,119 full-time and 2,249 part-time employees in the field. The November 30 employment figures for the field are lower than average for the year because of seasonal factors. At the peak of the field season the number of full-time employees is about 26,000 plus about 15,000 part-time and casual employees.

	Appropriated, 1960	Budget Estimates, 1961
Appropriated funds:		
National forest and other land management appropriations	a/ $111,575,800	$120,869,700
Research	14,545,400	16,332,000
Cooperation with States	b/ 12,327,800	12,334,800
Total appropriated funds (excluding permanent appropriations)	138,449,000	149,536,500

a/ Excludes $102,481 available from prior year balances.
b/ Excludes $1,776 available from prior year balances.

Summary of Appropriations, 1960, and Estimates, 1961

Appropriation Item	Appropriated, 1960	Budget Estimates, 1961	Increase (+) or Decrease (-)
Forest protection and utilization:			
Forest land management	$81,815,300	$88,159,700	+$6,343,900
Forest research	14,545,400	16,332,000	+1,786,600
State and private forestry cooperation	12,327,800	12,334,800	+7,000
Total, Forest protection and utilization	108,689,000	116,826,500	+8,137,500
Forest roads and trails	28,000,000	30,000,000	+2,000,000
Access roads	1,000,000	1,000,000	- -
Acquisition of lands for Superior National Forest	a/ - -	1,000,000	+1,000,000
Acquisition of lands for national forests, Special Acts	10,000	10,000	- -
Acquisition of lands for Cache National Forest	b/ 50,000	- -	-50,000
Cooperative range improvements	700,000	700,000	- -
Expenses, brush disposal (permanent)	6,500,000	6,500,000	- -
Roads and trails for States (permanent)	11,860,000	13,640,000	+1,780,000
Forest fire prevention (permanent)	c/ 20,000	20,000	- -
Restoration of forest lands and improvements (permanent)	d/ 100,000	100,000	- -
Payment to Minnesota (permanent)	121,309	121,309	- -
Payments due counties, submarginal land program (permanent)	500,000	500,000	- -
Payments to school funds, Arizona and New Mexico (permanent)	113,861	113,861	- -
Payments to States and Territories (permanent)	29,668,588	34,105,000	+4,436,412
Construction of improvements, Salt Lake City, Utah (permanent)	25,000	- -	-25,000
Total	187,357,758	204,636,670	+17,278,912
Deduct permanent appropriations (shown in detail above)	-48,908,758	-55,100,170	-6,191,412
Total (excluding permanent appropriations)	e/ 138,449,000	149,536,500	+11,087,500

a/ Available from prior year balance, $14,843.
b/ In addition, $87,638 available from prior year balances.
c/ In addition, $646 available from prior year balances.
d/ In addition, $7,083 available from prior year balances.
e/ In addition, prior year balance of $1,776 available under the item "Assistance to States for tree planting."

TRANSFER IN 1961 ESTIMATES

Since 1942 all library activities of the Department, both in Washington and the field, have been provided by the U. S. Department of Agriculture Library. With the substantially expanded programs in recent years, the Library has been unable to fully meet the needs of research personnel and other field employees for library services. In view of the seriousness of this problem, the Department conducted a study of library services available to, and needed by, its field employees. This study indicated an urgent need to strengthen field library services.

Therefore, effective July 1, 1959, the direct administration of field library activities was transferred from the Department Library to the agencies of the Department requiring such services, one of which agencies is the Forest Service. The Director of the Library will continue to prescribe library policy, standards, and procedures for the conduct of these field library services, and will exercise such controls as are needed to coordinate library services in the Department and avoid duplication of effort. The new arrangement will enable the Forest Service to strengthen field library services to more effectively support its programs, and hereafter to correlate library services with current program needs.

During fiscal year 1960 field library services to its own employees are being provided by the Forest Service, in part with funds transferred from the Library. The 1961 Budget proposes a transfer in the estimates of $19,000 from "Salaries and expenses, Library," to "Forest protection and utilization, Forest Service." This transfer represents the amount previously included in the Library appropriation for providing field library services to the Forest Service.

Forest Land Management

Adjustments in the Functional Distribution under the "National Forest Protection and Management" Activity

In order to provide more information on the amounts used and estimated for the various functions within the "National Forest Protection and Management" activity, the justifications have for many years included a functional project breakdown. It is proposed to adjust the breakdown in order to provide more complete and informative data on the requirements for this activity. The proposed breadkown is the same as presently used except for the elimination of the "Ranger District Management" item. The two changes are explained as follows:

1. Ranger District Management

   This account has been used to finance and record the salary and expenses of district rangers while engaged in ranger caliber work for all activities at the ranger district level of the Forest Service organization. While this work included all functional activities such as timber, range, recreation, fire, etc., in the past the cost was not charged to these functions but rather to the functional account "Ranger District Management."

   It is proposed to eliminate the project line item "Ranger District Management" and to budget and charge the salary and expenses of district rangers to the various program functions such as timber, range, recreation, etc.,which benefit from the services performed. This will result in having only functional projects which represent job performance. Also, it will result in reflecting total costs for each program activity, which is not the case under the present system.

   The time a district ranger spends on different programs may vary substantially from year to year depending on such unforeseen factors as fire, weather, and planned shifts in program emphasis. The table which follows shows the estimated average distribution to the various functions.

   The distribution of ranger costs to the various program activities will help to facilitate and simplify work plans and relate them to fund allocations.

   District rangers have for many years maintained cooperative relationships and participated with local groups and organizations in consideration of general forestry problems which are not always directly related to management of the national forests.

Included in this is the dissemination of forestry information to the public including some aspects of non-Federal forestry programs. It is planned that such incidental, collateral activities of ranger district personnel will continue to be budgeted and charged to the "National Forest Protection and Management" activity under the most appropriate and logical functional item.

2. Land Utilization Projects

By Executive Order 10851 and Proclamation 3326 dated November 27, 1959 and Executive Order 10844 dated October 9, 1959, approximately 300,000 acres of land subject to Title III of the Bankhead-Jones Farm Tenant Act, which were suitable for national forest purposes, were transferred to national forest status. The $283,000 for administration of these lands which was formerly included in the line item "Land utilization projects" is being transferred to other national forest project items, as shown in the table on the following page.

Proposed Adjustments in the Functional Project Structure for the National Forest Protection and Management Activity of the Forest Land Management Subappropriation

(Based on fiscal year 1960 appropriations)

Project Item	1960 Appropriation (adjusted)	Distribution of Ranger District Mgt.	Transfer of Land Utilization Project Funds	Totals in Proposed Revision
Timber resource management:				
(a) Sales administration and management	$17,820,000	$1,300,000	$95,000	$19,215,000
(b) Reforestation and stand improvement	3,215,000	240,000	- -	3,455,000
Recreation-public use	9,300,000	845,000	28,000	10,173,000
Wildlife habitat management	905,000	345,000	9,000	1,259,000
Range resource management:				
(a) Management	1,670,000	1,300,000	3,000	2,973,000
(b) Revegetation	1,500,000	95,000	- -	1,595,000
(c) Improvements	1,600,000	340,000	20,000	1,960,000
Soil and water management	1,370,000	230,000	3,000	1,603,000
Mineral claims, leases, and other land uses	3,485,000	844,000	3,000	4,332,000
Ranger district management	7,384,000	-7,384,000	- -	- -
Land utilization projects	1,400,000	- -	-283,000	1,117,000
Forest fire protection	12,635,000	1,305,000	33,000	13,973,000
Structural improvements for fire and general purposes (construction and maintenance)	8,250,000	540,000	89,000	8,879,000
Subtotal	70,534,000	- -	- -	70,534,000
Deduct amount advanced from "Cooperative Range Improvements"	-700,000	- -	- -	-700,000
Total, National Forest Protection and Management	69,834,000	- -	- -	69,834,000

(a) Forest Protection and Utilization

	Forest Land Management	Forest Research	State and Private Forestry Cooperation	Total
Appropriation Act, 1960	a/$77,815,300	$14,026,400	$12,327,800	a/$104,170,000
Supplemental appropriation (Supplemental Appropriation Act, 1960)	4,000,000	500,000	- -	4,500,000
Activities transferred in the 1961 Estimates from "Salaries and expenses, Library, Agriculture" for certain field library services	- -	≠19,000	- -	≠19,000
Base for 1961	a/81,815,300	14,545,400	12,327,800	a/108,689,000
Budget Estimate, 1961	a/88,159,700	16,332,000	12,334,800	a/116,826,500
Increase, 1961	≠6,343,900	≠1,786,600	≠7,000	≠8,137,500

a/ In addition, $700,000 is available by transfer from "Cooperative Range Improvements."

SUMMARY OF INCREASES AND DECREASES, 1961

Forest Land Management:	
To increase rate of national forest timber sales and timber cutting ..	≠805,000
To increase the rate of providing adequate recreation facilities to accommodate public use of the national forests	≠4,602,000
To strengthen fire control on the national forests	≠301,000
Decrease due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this appropriation	-146,100
To accelerate the level of maintaining fire and administrative structural improvements	≠350,000
For employee health benefit costs pursuant to Public Law 86-382	≠432,000
Subtotal	≠6,343,900
Forest Research:	
Decrease due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this appropriation	-158,400
To expand research in forest, watershed, wildlife habitat, recreation, and range management	≠301,400
To speed the development of more effective methods of reducing the costs and damages from forest fires	≠75,355
To increase forest insect research	≠60,280
To increase forest disease research	≠65,310
For research in forest products utilization	≠251,155
For forest economics and marketing research	≠100,500
For construction of research facilities	≠1,000,000
For employee health benefit costs pursuant to Public Law 86-382	≠91,000
Subtotal	≠1,786,600
State and Private Forestry Cooperation:	
For employee health benefit costs pursuant to Public Law 86-382	≠7,000
Total increase	≠8,137,500

PROJECT STATEMENT

Project	1959	1960 (estimated)	Increase or decrease: Health Benefit Costs (P.L.86-382)	Increase or decrease: Other	1961 (estimated)
1. Forest Land Management:					
a. National forest protection and management:					
(1) Timber resource management:					
(a) Sales administration and management ...	$14,864,963	$19,215,000	+$155,000	+$805,000(1)	$20,175,000
(b) Reforestation and stand improvement ..	3,066,496	3,455,000	+10,000	- -	3,465,000
(2) Recreation-public-use	10,796,366	10,173,000	+55,000	+4,602,000(2)	14,830,000
(3) Wildlife habitat management	1,078,517	1,259,000	+11,000	- -	1,270,000
(4) Range resource management:					
(a) Management	3,030,305	2,973,000	+27,000	- -	3,000,000
(b) Revegetation	1,578,501	1,595,000	+5,000	- -	1,600,000
(c) Improvements	2,014,733	1,960,000	+5,000	- -	1,965,000
(5) Soil and water management	1,595,374	1,603,000	+12,000	- -	1,615,000
(6) Mineral claims, leases, and other land uses	4,006,576	4,332,000	+37,900	- -	4,369,900
(7) Land utilization projects..	926,526	1,117,000	+8,000	- -	1,125,000
(8) Forest fire protection	13,508,706	13,973,000	+71,000	+301,000(3)	14,345,000
(9) Structural improvements for fire and general purposes (construction and maintenance) ..	11,796,233	8,879,000	+17,100	-146,100(4) +350,000(5)	9,100,000
Subtotal	68,263,296	70,534,000	+414,000	+5,911,900	76,859,900

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Project	1959	1960 (estimated)	Increase or decrease: Health Benefit Costs (P.L. 86-382)	Increase or decrease: Other	1961 (estimated)
Deduct amount advanced from "Cooperative Range Improvements"	-700,000	-700,000	- -	- -	-700,000
Subtotal, National forest protection and management	67,563,296	69,834,000	+414,000	+5,911,900	76,159,900
b. Fighting forest fires	13,588,770	5,000,000	- -	- -	5,000,000
c. Insect and disease control:					
(1) White pine blister rust control	3,189,974	[a/] 3,253,700	+11,100	- -	[a/] 3,264,800
(2) Other pest control	3,210,327	3,628,100	+6,900	- -	3,635,000
Subtotal, Insect and disease control	6,400,301	6,881,800	+18,000	- -	6,899,800
d. Acquisition of lands (Weeks Act)	82,948	100,000	- -	- -	100,000
Total, Forest Land Management	87,635,315	81,815,800	+432,000	+5,911,900	88,159,700
2. Forest Research:					
a. Forest and range management research	6,813,268	7,104,000	+44,500	-95,300(6): +301,400(7)	7,354,600
b. Forest protection research:					
(1) Forest fire research	715,676	835,000	+5,000	-10,355(6): +75,355(8)	905,000
(2) Forest insect research	914,765	995,000	+6,000	-12,280(6): +60,280(9)	1,049,000
(3) Forest disease research	734,548	820,000	+5,000	-10,310(6): +65,310(10)	880,000
Subtotal, Forest protection research	2,364,989	2,650,000	+16,000	+168,000	2,834,000

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Project	1959	1960 (estimated)	Increase or decrease: Health Benefit Costs (P.L.86-382)	Increase or decrease: Other	1961 (estimated)
c. Forest products utilization research	2,818,760	2,854,400	+18,000	+251,155(11) -20,155(6)	3,103,400
d. Forest resources research:					
(1) Forest survey	1,504,755	1,490,000	+10,000	-10,000(6)	1,490,000
(2) Economics research	418,166	447,000	+2,500	+100,500(12)	550,000
Subtotal, Forest resources research	1,922,921	1,937,000	+12,500	-10,000 +100,500	2,040,000
e. Forest research construction	2,576,898	- -	- -	+1,000,000(13)	1,000,000
Total, Forest Research	16,496,836	14,545,400	+91,000	+1,695,600	16,332,000
3. State and Private Forestry Cooperation:					
a. Cooperation in forest fire control	10,090,311	10,085,000	+2,500	- -	10,087,500
b. Cooperation in forest tree planting	792,848	290,000	+1,000	- -	291,000
c. Cooperation in forest management and processing	1,516,730	1,542,000	+1,000	- -	1,543,000
d. General forestry assistance	396,802	410,800	+2,500	- -	413,300
Total, State and Private Forestry Cooperation	12,796,691	12,327,800	+7,000	- -	12,334,800
Total, Forest Protection and Utilization, Forest Service	116,928,842	108,689,000	+530,000(14)	+7,607,500	116,826,500
Unobligated balance	255,511	- -	- -	- -	- -
Total employee health benefit costs (P.L.86-382)	[- -]	[- -]	/530,000/	/+12,000/	/547,000/

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Project	1959	1960 (estimated)	Increase or decrease: Health Benefit Costs (P.L. 86-382)	Increase or decrease: Other	1961 (estimated)
Total available or estimate	b/ 117,184,353	108,689,000	+530,000	+7,607,500	116,826,500
Transferred from "Conservation reserve program, Commodity Stabilization Service"	-5,432,200	- -			
Transfer in 1961 estimates from "Salaries and expenses, Library"	-18,753	-19,000			
Total appropriation or estimate	111,733,400	108,670,000			

a/ Includes $361,410 to be allocated to the Department of the Interior.
b/ Includes $625,348 obligated in 1958 under the advance procurement authorization (P.L. 85-386).

INCREASES AND DECREASES, 1961

The net program increase of $5,911,900 for the subappropriation "Forest Land Management" consists of:

(1) An increase of $805,000 for timber sale administration: (a) to provide for sale of 11.1 billion board feet and a cut of 9.6 billion board feet under the regular sales program, (b) to expand the special small sale and salvage program, and (c) to achieve advance sale preparation of 2.0 billion board feet.

Need for Increase: Continued expansion in the level of national-forest timber sales is necessary to keep pace with market demand. Increasing population and a rising economy, coupled with a growing scarcity of timber generally, points to the fact that the national forests must produce a steadily increasing amount of timber under the Forest Service sustained-yield program to help meet the needs of the country. Meeting these needs from the national forests will require increased funds to finance the administration of existing sale contracts, enter into new contracts, and do advance preparation work on sufficient future sales to assure having them ready to offer at appropriate times.

In addition to helping to meet the country's wood needs, national-forest timber sales are needed to keep wood processing plants in operation and provide economic stability. It is expected that the requested increase of $805,000 will return gross receipts to the Treasury of about $4 million. This addition will help produce national-forest timber sale gross returns to the Treasury of about $135 million for fiscal year 1961.

The proposed appropriation increase is made up of the following items:

(a) Regular Sales Program. The proposed increase is needed partly to meet the expected increase in the cut of national-forest timber to 9.6 billion board feet and at the same time to make

new sales totaling 11.1 billion board feet. These volumes are an increase of 200 million feet in cut and 400 million feet in sales over the all time highs in national-forest timber sale business which are expected in fiscal year 1960.

(b) Special Small and Salvage Sales. The special financing provided in fiscal year 1960 to salvage dead and insect or disease-affected timber is proving to be an important and successful program. In addition to focusing action in moving such timber before it becomes unmerchantable, the program is helping to provide the kind of sales which can be effectively operated by small business concerns. These sales are more costly to administer than ordinary sales but such additional costs are more than offset by income. Also, there is additional employment and business support which would not be generated otherwise. Wood is one of our renewable resources which is in short supply and much of the material captured by the salvage program would be lost if it were not possible to give special emphasis to such sales.

The special funds authorized in fiscal year 1960 are making it possible to carry out special small and salvage sales on 82 ranger districts, as planned. The increase proposed for fiscal year 1961 will make it possible to extend this special program to an additional 20 districts with the aim of selling an additional 100 million board feet of salvage timber. The additional volume of timber to be cut as a result of this special financing will be about 60 million board feet, during the first year, bringing in about $300,000 in revenue. The additional cut of 60 million board feet plus 410 million from the funds appropriated in fiscal year 1960 will provide a total cut of 470 million board feet under this program in fiscal year 1961.

(c) Advance Sale Preparation. As the level of national-forest sale business expands and timber purchasers become increasingly dependent on regular schedules of timber offerings, an urgent need has developed for performing a part of the sale preparation job at least a year in advance of the time of advertisement. With this increased lead time it will be possible to work out unforeseen difficulties and avoid delays in scheduled offerings which are disturbing to dependent industries and disadvantageous to the Government. The proposed increase will be used to increase the advance sale preparation from 1.2 billion to about 2.0 billion board feet annually.

It may be necessary to use some of this money to finance the advance preparation of sales on tribal lands of the Klamath Indian Reservation, Oregon. Such lands are now being offered for sale to private parties and if not sold they will be Federally purchased for national-forest purposes under the Act. By July 1, 1960, it will be known what portions of the lands will become national-forest lands under the Klamath Termination Act of 1954 (68 Stat. 718), as amended. However the Proclamation by the Secretary of Agriculture declaring

these lands as national forests will not be formally issued until April 1, 1961. If by July 1, 1960 any portion or all of these lands are scheduled for designation as national forest lands it will be essential to prepare timber sales prior to the time that a formal declaration is issued. It is necessary that this preparation work be done before April 1, 1961 so that sales may be offered promptly when the lands receive national-forest status. Such action would be essential to the demands of and to provide support to dependent wood processing industries in the Klamath Basin. It is estimated that about 200 million feet should be prepared for sale at an estimated cost of about $40,000.

Plan of Work Summary:

Regular Sales:

Sale preparation:	11.1 billion feet	at	$0.47 per M	$5,215,000
Sale administration:	9.6 billion feet	at	1.23 per M	11,800,000
Advance sale preparation:	2.0 billion feet	at	0.22 per M	440,000

Special small and salvage sales (sell 510 million feet and cut 470 million feet)	1,020,000
Timber inventories and management plans	1,700,000
Total	20,175,000
1960 appropriation	19,215,000
Increase requested ($805,000 plus $155,000 for Health Benefit costs)	960,000

(2) An increase of $4,602,000 to provide recreational facilities and service to accommodate camper and picnicker public use.

Need for Increase: The overuse of campgrounds and picnic sites continues to increase at an alarming rate. Overuse amounted to 68% in 1957 and it is expected to be 103% in 1961. This means that campers and picnickers are literally wearing out and destroying the safe and sanitary sites in the national forests to which they travel miles to seek relaxation and comfort.

The popularity of national forest recreation areas is increasing rapidly. Each year there has been an increase of over 3 million man-days' use of campgrounds and picnic sites. It would require 8,000 new camp and picnic family units annually to safely accommodate this increase. In 1957, there was a deficiency of 29,300 family units needed to accommodate the public. Available funds have made it impossible to reduce this deficiency, and with the sharp increase in public use each year this deficiency is expected to amount to 51,700 family units in 1961, as shown in the following table.

New construction

Calendar year	Total visits actual or expected (millions)	Camp and picnic man-days' use (millions)	Camp and Picnic Family Unit: Needed for safe public use (number)	Existing or planned to build (number)	Remaining to be built for safe use (number)	Current or expected overload (percent)
1957	61.0	30.7	72,300	43,000	29,300	68
1958	68.5	34.2	80,400	46,700	33,700	72
1959	75.0	38.0	89,400	48,100	41,300	86
1960	80.0	40.5	95,300	48,700	46,600	96
1961	86.0	43.5	102,000	50,300	51,700	103

Funds available during the first three years of the Operation Outdoors program have been sufficient to provide adequate policing, cleanup, and maintenance of existing facilities and some rehabilitation of worn-out recreation facilities. In 1957, there were 40,175 family camp and picnic units in need of rehabilitation and by the end of 1960, 9,264 units will have been rehabilitated, or 23.1% of the entire job, as shown in the following table.

Rehabilitation

Calendar year	Camp and Picnic Family Units: Total needing rehabilitation (number)	Total rehabilitated or planned during year (number)	Total remaining to be rehabilitated or planned (number)	Total rehabilitation job accomplished to date (percent)
1957	40,175	300	39,875	0.7
1958	39,875	1,598	38,277	4.7
1959	38,277	4,366	33,911	15.6
1960	33,911	3,000	30,911	23.1
1961	30,911	11,000	19,911	50.5

Plan of Work: The $4,602,000 increase will be used for the rehabilitation of worn-out facilities and the development of new family camp and picnic units in strategic locations where increased use is heaviest. Specifically, this increase will be used to rehabilitate 8,000 family camp and picnic units and build 1,000 new ones which, with the 3,000 units that will be rehabilitated, and 600 new ones constructed through a continuation of present authorizations, makes a total of 11,000 and 1,600 family units to be rehabilitated and constructed, respectively.

(3) An increase of $301,000 to strengthen fire control functions and facilities.

Need for Increase: Protecting the national forest resources from damage by fire is an integral part of managing the national forests. The protection organization which does this job must cope with the increased numbers of people that are using the national forests and must act with the knowledge that the resources being protected continue to increase in value.

Costs of maintaining the fire control organization do not remain stable. It has been necessary to reduce manning strength in some locations, and to reduce the number of days of planned occupancy of many fire control positions because of unavoidable increases in equipment operating costs and increases in some other items such as salaries and material costs. Some of these positions were subsequently manned on an emergency basis and financed from the Fighting Forest Fire activity during periods of high fire danger. Temporary emergency manning is not as effective as planned season-long manning and reduces the availability of trained protection people available to fight fire.

Plan of Work: The funds will be used to strengthen the protection organization. Emphasis will be on restoring manpower and to further integrating use of airplanes in the fire control organization. Selected suppression crews will be brought up to full strength, and high priority lookouts which were manned on an emergency financing basis will be manned. The length of occupancy of key fire positions and fire stations will be extended, particularly in those circumstances where experience of the last two years indicates that longer occupancy is required for more nearly adequate protection. Attention will also be given to prevention patrols, and to extending to other parts of California the aerial tanker program put into effect in southern California in fiscal year 1959. Since the greatest need to strengthen the protection organization continues to be in California, approximately two-thirds of the funds will be allocated for the work there.

(4) A decrease of $146,100 due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this subappropriation.

(5) An increase of $350,000 to accelerate the level of maintaining existing fire and administrative structural improvements.

Need for Increase: It is essential in the interests of management economy to keep in reasonable repair the physical plant on which all national forest activities depend. This plant, in the main, consists of:

1. Fire lookout towers and observatories
2. Dwellings, cabins, and barracks at field headquarters
3. Field offices
4. Utility buildings
5. Water and sewage systems
6. Communications systems, telephone lines and radios
7. Landing fields and helispots
8. Fences

These improvements are dispersed over the national forest area of about 181,000,000 acres. They are an integral and essential part of the management and protection of this large land area, involving forest fire protection, timber harvesting, watershed protection, and other land use activities on the national forests.

A recent survey of existing administrative improvements indicated a current maintenance cost of $6,500,000. Approximately $1,200,000 of this cost is financed from other benefiting appropriations, such as Brush Disposal, Sale Area Betterment Collections, and Forest Roads and Trails. This leaves $5,300,000 requiring financing from the activity "National Forest Protection and Management." Current financing of $3,700,000 covers about 70% of this need.

The increase of $350,000 is proposed in order to meet the most urgent needs. Some of these needs are critical deficiencies in some water and sewage disposal systems, and in some unsafe building foundations and electric wiring systems. Increased use and modern air equipment have made unsafe or inadequate for use of modern aircraft some of the mountain air strips and helispots.

Plan of Work: Funds will be distributed to field units based on the number of improvements by classes currently justified by program utilization and on analyzed unit costs of maintenance. Priorities of maintenance are established at forest, and sometime regional levels, so that structural improvements vital to protection of the resources will receive an appropriate degree of maintenance.

The net program increase of $1,695,600 for the subappropriation "Forest Research" consists of:

(6) A decrease of $158,400 due to providing a direct appropriation to the General Services Administration for certain leasing costs previously paid from this sub-appropriation.

(7) An increase of $301,400 for forest, range, and watershed management investigations as follows:

Need for Increase: Continued progress toward full productivity in the management of the timber, forage, water, wildlife, and recreational resources of the national forests requires wider knowledge and better understanding of the nature and cause of the technical problems now impeding this development. When the underlying physical, biological, and economic relationships that create these problems are revealed through research, management techniques can be devised to overcome them. Principal fields needing attention are:

(a) Improved forest management methods for producing timber crops. Artificial reforestation in the United States has doubled in the past five years and is continuing to increase at a rapid rate. More than 1-1/2 million acres are now artificially regenerated annually. Thus, the seriousness of the many existing seeding and planting problems has been accentuated, and under some conditions failures are high and costs excessive. In other instances the very magnitude of the operation has brought into focus a whole set of new problems. These developments have emphasized the need for more research on how to increase the efficiency of handling and storing tree seed, nursery production methods, brush control and site preparation, and direct seeding and tree planting. Tree planting is especially difficult in some of the Western forest types where rugged terrain and climatic extremes make the job costly and uncertain. Although the immediate

need is for reliable methods, these can most surely and efficiently be devised only through a better understanding of tree and seed physiology, soil and site requirements of the various tree species, and other biological relationships.

Another opportunity for improving both productivity and quality of tree growth involves the development of superior hybrids. Research has shown that desirable qualities, such as fast growth, high specific gravity of wood, and resistance to insects and diseases, can be bred into some tree species but the actual development of these superior trees requires painstaking basic research to determine the extent of variation and degree of heritability of the desired characteristic. Problems related to this genetic improvement involve ways to induce flower formation and the removal of barriers to hybridization. This research is particularly needed in the West and Northwest where tree improvement projects have recently been established to implement the program for the national forests.

In many of the national forests where the timber harvest will be increased in areas of heretofore undeveloped forest types, research in timber management must be intensified. Examples are the forests of coastal and interior Alaska, the upper slope types of the Pacific Coast States, and the lodgepole pine types of the Rockies. In these newly developed areas the forest manager is handicapped by lack of information on the growth and yield of the timber types in the forest to be put under management, the suitability of various forest sites and soils for tree regeneration, which species to favor in reseeding the logged over areas, and the degree of response to be expected from cultural practices such as intermediate cutting, thinning and pruning.

Programs of reforestation and forest management are often critically delayed by the depredations of various forest animals, from mice to bears. This type of damage is most prevalent across the northern part of the country. Its most serious forms are destruction of seed and seedlings by rodents; deer browsing on valuable hardwood such as black cherry, sugar maple, and birch in the Northeast, and on Douglas fir and pine in the West; porcupine girdling of pines; and bear damage to saplings and poles. On the national forests of the Northwest serious animal damage occurs on about two million acres of commercial forest land. On all forest lands in the Northwest estimates place the annual cost of animal damage at $15,000,000. Current research must be expanded and new research started if we are to learn how to reduce these losses. Moreover, methods of control must be worked out in harmony with acceptable wildlife management practices.

(b) Improved watershed management practices. Early exploratory research indicated that water yields can be increased by manipulation of the forest cover. In most parts of the West the timing and quantity of water yields is so important that there is need to develop information for a number of forest environment factors not yet studied. This increase would permit strengthening this type of research and extending it to new and important areas.

Concurrently with this work, and of equal importance, additional research should be directed toward determining how best to minimize damage to watershed areas from various forest uses. The recent expansion of logging operations into the steeper and rougher areas is likely to create or aggravate soil and water disturbances that could directly affect municipal, industrial, agricultural and recreational interests. Proper management of watersheds to avoid such damage will depend upon better knowledge and more complete understanding of the effects on stream flow, soil stability and sediment production, of the various patterns and intensities of timber harvesting, including road construction and logging, and of the grazing of domestic livestock. Of particular importance is the need to learn more about the interrelations of the forest cover to geology, climate and other natural factors so that practical means to avoid or correct damage to the watershed can be developed.

(c) Development of improved livestock grazing management practices on high range-watersheds and of methods for improving wildlife habitat. Administrators of range lands on western national forests are handicapped in their efforts to halt deterioration and restore optimum range and watershed conditions by a lack of research findings on which to base sound management practices. Maximum sustained production of forage and livestock, consistent with maintenance or improvement of soil, water, and other important values, is the primary management objective on these lands. The key to the attainment of this objective is the development and application of grazing practices that are based upon both vegetation and livestock requirements. Present forage production falls considerably short of the potential yields on some areas, particularly on high-elevation summer ranges in the Intermountain area, and watershed conditions are poor.

The proposed increase would allow intensification of research on the soil and site requirements and the physiology of important range plants, their reaction to varying intensities and schedules of grazing, and the carrying capacity of the range. With a better foundation of knowledge, more effective patterns and techniques for intensity and season of grazing, distribution of stock, and maintenance of range productivity can be formulated.

In addition to timber, water and livestock forage, the national forests provide browse and habitat for approximately 4 million big-game animals. During the past 20 years big-game populations have doubled, thus intensifying the impact of this use on the land. Full multiple use of the forests and related ranges requires added attention to improving the management of wildlife habitat through modification of timber stand improvement and grazing practices, as well as through other means of increasing food supplies for big game. Studies are especially needed to determine methods of improving food and cover on some 1-1/2 million acres of key wildlife habitat areas on the national forests.

Research is also needed to determine how forest and range lands can be managed in order to support optimum game populations in harmony with other uses. More complete knowledge of the impact of joint livestock and game use of the forest ranges, and of the influence of silvicultural and timber harvesting practices on the wildlife habitat, would enable forest land managers to anticipate potential sources of conflict which could impair full production. Management methods could then be developed to avoid such adverse effects.

Plan of Work: The increase would be used to strengthen the research programs of the ten regional forest and range experiment stations on the most urgent problems. The $301,400 increase would be allocated to the three principal fields of work outlined above as follows:

Forest Management Research	$135,900
Watershed Management Research	90,300
Wildlife Habitat, Recreation and Range Management Research	75,200
Total	301,400

(8) An increase of $75,355 to speed the development of more effective methods of reducing the costs and damages from forest fires.

Need for Increase: This increase would be used to strengthen research on the "blow up" fire problem in the West and for studies of fire control in Alaska.

In spite of substantial progress in controlling the nation's forest fires, large resource losses, sometimes the loss of human lives, and great expenditures for suppression are caused by the occasional erratic fire that breaks loose and defies ordinary methods of control. A greater understanding of the manner in which fuel, topographic, and weather variables combine to produce blow-up fires is needed. In this way some forewarning of their occurrence may be available and fire fighters will be able to prepare more adequately for effective attack and, hence, control before large losses are suffered. Research of this kind would benefit federal, state, and private forest fire fighting agencies who commonly share the same problem.

Losses from forest fires in Alaska have been especially severe over the years and adequate control methods have not yet been developed to combat fires in the large roadless areas of this State. Studies are needed to (1) develop an improved fire danger rating system to guide preparations for fire fighting and (2) develop or adapt aerial fire fighting techniques to Alaskan problems.

Plan of Work: The proposed increase would be used as follows: $25,100 for fire weather and related research in Alaska; $50,255 to strengthen research on fire behavior in western United States.

(9) An increase of $60,280 for forest insect research.

Need for Increase: This increase will be used to expand research on biological control of forest insects, especially in the South, and on forest insects in Alaska.

Indirect control of forest insects through the use of biological agents, including insect parasites, predators, and disease pathogens is longer-lasting, safer, and less expensive than through the use of other methods usually used to suppress epidemic infestations. Little is known of the identity or effectiveness of biological agents affecting many of our most important forest insects, or how they can be utilized to greatest advantage in controlling these insects. To provide the needed information the present research program must be expanded.

Insect outbreaks are known to occur at frequent intervals in the forests of Alaska, and sometimes to kill or damage large volumes of valuable timber. So far, very little is known about these insects, including their biologies and natural enemies, as well as the conditions conducive to outbreaks. This makes it difficult to evaluate accurately the needs for control of infestations, or to recommend the best control measures to apply where they are deemed advisable.

Plan of Work: Approximately $30,140 would be used to intensify biological control research in the South and $30,140 for strengthening research on forest insect control in Alaska.

(10) An increase of $65,310 for forest disease research.

Need for Increase: This increase would be used to develop a greater knowledge of the control of forest tree diseases not now well understood and for which no satisfactory control measures are known. Lack of knowledge on how systemic vascular diseases, root rots, and other diseases kill or severely damage trees is hindering development of cheaper and more effective control methods. For example, trees infested with oak wilt or other similar diseases wilt and die, perhaps from mechanical plugging of the pores or perhaps from an unknown toxin. Discovery of the lethal principle involved would open up entirely new avenues for prevention and control measures.

An important problem concerns root rots that are causing unexpected and alarming losses in young pine stands, particularly when established on old agricultural lands. Observational evidence indicates that disturbance of the original soil flora and fauna may be primarily responsible. Only when we understand the factors involved can we recommend remedial practices.

Other pressing problems include the need for better control of heartrots, dwarfmistletoe, witches brooms, and various rusts. These diseases are causing heavy losses on many of the western national forests.

Plan of Work: The proposed increase would be used to strengthen the research on oak wilt and similar diseases in the central hardwood region ($35,170), and to increase studies of root rots, heartrots, and other disease pests in western United States ($30,140).

(11) An increase of $251,155 for forest products utilization research at forest experiment stations and at the Forest Products Laboratory.

Need for Increase: The purposes of this increase are (1) to accelerate the development of quality grades for logs and trees; (2) to accelerate research on new industrial chemicals from wood residues; and (3) to strengthen the study of regional utilization problems with emphasis on utilization of little-used species.

Available grading systems for estimating the quality of standing timber are generally inadequate or entirely lacking. They are needed for improving timber sale appraisals on both national forests and private lands, and for a sounder technical basis from which guidelines for timber stand improvement can be developed. Such quality grading systems are also essential to improving marketing opportunities for, and utilization of, public timber throughout the nation. Much additional study is needed of the nature and significance of the various types of defects in trees and logs in relation to the quality and value of products that can be cut from them.

Recent research results show that many industrial chemicals can be produced from the cellulosic components of wood. However, the utilization of the lignin residue from these chemical processes as well as from existing commercial pulping processes remains unsolved. Although lignin is about one-third of the total wood substance, as yet chemical utilization is minor. The full success of a wood-chemical industry depends upon utilization of all of the wood substance. This can only be done if present lignins can be used or if new processes produce a less degenerated lignin. There is need to expand research to solve this problem.

Research on regional utilization problems aimed at modifying results of basic forest products research to permit its application to local or special conditions and situations has been highly effective in the past although this program has been quite limited in extent. The expanding program of developing the national forests will depend increasingly on improved and complete utilization of the timber resource. Forest products utilization research is particularly needed to adapt basic principles to meet the varying requirements of timber processors and markets with the objective of expanding possible outlets for all timber products, but especially for the little-used species and logging residues.

Plan of Work: The proposed increase would be used to strengthen the work as outlined above: $70,300 to accelerate a nationally coordinated attack to develop log-and tree-quality grades; $150,700 for increasing wood chemical research at the Forest Products Laboratory; and $30,155 for strengthening regional utilization research.

(12) An increase of $100,500 for forest economics and forest products marketing research as follows:

Need for Increase:

(a) To develop principles and procedures for the evaluation of multiple uses of forest lands. The rapid increases in population and pressures for natural resources are reflected in difficult and critical problems for

public forest administrators and other forest owners in determining the best use or optimum combination of uses of forest lands. These problems of balancing land uses exist for a wide variety of situations where choices must be made among timber growing, recreation, forest management, livestock production, or other competing uses. Administration of national forest lands, for example, must resolve increasingly serious conflicts among such uses. Research is needed to determine the potential economic returns and public values that may be derived from timber production and other forest uses under various conditions of site, location, ownership, and markets. There is special need to develop practical guides for use by public land managers and owners of private property in choosing between conflicting uses of forest lands in problem areas.

(b) To appraise potential markets for timber and wood products as a guide to forest management and resource development policies. On many national forest lands and private forest ownerships there are large volumes of little-used species or low-grade timber for which markets are limited or nonexistent. Millions of cords of woods and mill residues also are still unsalvaged despite major increases in use of such material in recent years. At the same time in numerous consumer markets, lumber and other wood products are meeting increasing competition from non-wood materials. Research is needed to determine the economic feasibility of expanding local industries and markets for the little-used timber resources on both public and private lands, and to appraise prospective general market trends and outlook for various species and classes of timber. Such information is essential to provide basic guides to resource development and timber management policies.

Plan of Work: The proposed research on evaluation of multiple land uses would be carried out largely in the western States and in areas where there are major problems of choice in management and use of forest lands. Research to appraise potential markets for timber and wood production would be carried out at both the Washington office and at regional forest experiment stations. The increase would be used as follows: (a) multiple use problems, $50,250; (b) marketing research, $50,250.

(13) An increase of $1,000,000 for construction of research facilities.

Need for Increase: This increase will permit construction of office-laboratories at the following three locations: Corvallis, Oregon; Durham-Raleigh, North Carolina; and Stoneville, Mississippi.

Corvallis, Oregon

A laboratory for forest insect and disease research $350,000

This building is urgently needed to provide essential laboratory space and scientific equipment to implement properly the forest insect and disease research and related tree physiology studies now under way but inadequately housed at several widely separated locations. The proposed construction would permit bringing together this research and facilitate its correlation with related work performed by Oregon State College, including its Forestry School, the Agricultural Experiment Station, and the Oregon Board of

Forestry Research Center, all of which have active research programs in Corvallis. The proposed laboratory would provide modern scientific instruments and equipment especially important in the development of biological control methods which can supplement or replace costly direct pest control programs; for the study of systemics which will help solve problems such as animal damage to trees and reproduction, and will provide time-saving short cuts by the use of new laboratory techniques.

Durham-Raleigh, North Carolina

A laboratory for forest insect and disease research $350,000

This laboratory will provide facilities not now available for the present programs inadequately housed at several locations in southeastern United States. It will permit centralizing research at a major center of universities where related investigations are underway and where strong cooperative programs could be developed. These research institutions include Duke University at Durham and its graduate School of Forestry; North Carolina State College at Raleigh and its Forestry School and Agricultural Experiment Station; and the University of North Carolina at Chapel Hill. The strong research programs in and related to forestry, already under way at these institutions, will provide an environment for advanced and productive research and economies through cooperative use of special equipment which will speed up and facilitate attack on southern and eastern forest insect and disease problems. The laboratory will be equipped to study the most serious pest problems of the southern and eastern States, such as nutritional diseases, tree seedling and nursery pests, and cone and seed insects, all of which are at present limiting the large tree planting programs.

Stoneville, Mississippi

A laboratory for bottomland hardwood research $300,000

This office-laboratory building is urgently needed to provide adequate facilities for the research program on southern bottomland hardwoods. Research personnel now occupy space in agricultural experiment station buildings. No laboratory facilities are available and crowded conditions have intensified in the last few years to a point where inefficient working arrangements are limiting progress. Some space is shared by unrelated activities to the detriment of both research activities. No modern equipment is available to facilitate investigations. A new building, properly equipped, will speed research on studies of bottomland hardwood production and management and on utilization of the important species.

Plan of Work: The $350,000 proposed for each of the laboratories at Corvallis, Oregon and Durham-Raleigh, North Carolina, will provide space for the current programs in insect and disease research and allow for some moderate expansion. Only the most critical needs would be provided for at these two locations. Later, and in accordance with plans included in the "Program for the National Forests," other laboratory-office units are proposed. These would cost about $650,000 at each location and would house other Forest Service research units that cannot be accommodated in the initial building planned.

The laboratory at Stoneville will provide for current and planned programs. Greenhouses and service buildings costing an estimated $75,000 will be added later as future budgetary situations may permit.

(14) An increase of $530,000 is required to meet employee health benefit costs under Public Law 86-382, applicable to the base for 1961.

The Federal Employee Health Benefits Act of 1959 provides that the Government will share with employees the cost of providing health benefit plans for the protection of employees and their dependents. The Act becomes effective with the start of the first full pay period in fiscal year 1960 (for most employees the effective date will be July 10, 1960). Federal costs of the health benefit program cannot be determined finally until benefit plans have been contracted with insurance companies and some experience with employee selection of alternative choices has been obtained. For purposes of estimating fiscal year 1961 costs, therefore, the Budget Bureau has asked all Federal agencies to assume that the Civil Service Commission will set the initial agency contribution per employee at the minimum rates authorized by law ($1.30 for self only, and $3.12 for self-and-family, on a biweekly basis). In the absence of reliable statistics, the Budget Bureau also asked for agencies to assume that (a) 90% of all employees would participate, and (b) 40% of participating employees would elect coverage for themselves only, and 60% for self-and-family. These assumptions on participation have been followed in developing the Forest Service estimates.

Based on the foregoing assumptions, the 1961 Forest Service budget reflects a total of $794,325 estimated employee health benefit costs to all appropriations and funds available, including revolving funds, advances and reimbursements from other agencies, and trust funds. Of this total, absorption of $252,325 is proposed, and only under the Forest protection and utilization appropriation are added appropriations being requested. The level of absorption proposed is the maximum that can be achieved without impairment of public programs and services for which the Forest Service is responsible. Of the $542,000 increase in appropriations requested for health benefit costs, $530,000 relates to the 1961 appropriation base and $12,000 to program increases proposed for 1961.

The Federal costs of benefits to annuitants have not been reflected in these estimates since it is understood that estimates of appropriations to the Civil Service Commission are being presented for this purpose.

The total employee health benefit costs for 1961 are distributed as follows by appropriations and funds:

Forest protection and utilization	$547,000
Forest roads and trails	120,000
Superior National Forest	150
Expenses, brush disposal, Forest Service	12,500
Forest fire prevention	170
Working capital fund	32,000
Advances and reimbursements	15,400
Trust funds	66,675
Allocation from International Cooperation Administration	430
Total employee health benefit costs	794,325

STATUS OF PROGRAM

FOREST LAND MANAGEMENT

National Forest Protection and Management

Current Activities: The purpose of this program is to manage, protect, and develop the national forests and insure that timber, water, range, recreation, wildlife, and other resources are utilized in a manner so as to best serve the Nation.

National forests are managed under the multiple-use principle with practically all areas used for, or serving, more than one purpose or objective. For example, 50 percent of the area within the national forests of the continental United States serves five different purposes: (1) timber production, (2) watershed protection, (3) forage production, (4) wildlife production, and (5) recreation. An additional 28 percent serves four purposes in varying combinations. Of the remainder, 21 percent of the total serves three purposes with only one percent of the total reserved for one purpose exclusively, mainly campgrounds and special use areas, such as summer home sites, pastures, corrals, etc.

The varied interests which inevitably conflict and which must be reconciled, the vast areas covered, and the unusual complexities clearly require careful planning and skillful management of the national forest properties.

The protection of national forests from fire and trespass is made difficult by the large area to be protected, the general inaccessibility, the many thousands of miles of exterior boundary, and the impossibility of taking preventive action with such a problem as lightning-caused fires.

National forest boundaries encompass an aggregate area of about 225 million acres in 41 States and Puerto Rico, of which some 181 million acres are under Forest Service administration. Many tracts of privately owned lands are interspersed within the Federal holdings.

The economic importance of the national forests will be realized when it is considered that:

a. The national forests produced a cash income in the fiscal year 1959 of about $122.1 million. Approximately 65 percent of this amount is credited to the general fund in the Federal Treasury (miscellaneous receipts). The remainder is distributed in accordance with special acts of Congress, including 25 percent to the States and

counties in which lands are located. In addition to cash receipts, there are the non-monetary values of water, recreation, and wildlife.

b. The area within national forest boundaries is equivalent to some ten percent of the area of the continental United States.

c. The national forests supplied 8.3 billion board feet in fiscal year 1959 to the nation's forest products industries. Dependence of the forest products industries on national forest timber continues to increase as the result of depletion of good quality timber on private lands.

d. About 6,000,000 head of domestic livestock (including calves and lambs) are grazed on national forest lands.

e. The national forests provide protection to municipal water supplies for nearly all western cities and towns and many in the East, to irrigation water used on about 20,000,000 acres of western lands, and to many streams with water power developments. They provide flood protection to thousands of acres of rich valley lands and help to prevent more rapid siltation of reservoirs and stream channels.

f. They provide a habitat for a large part of the big game animal population, for birds, and for millions of small game animals and fur-bearers.

g. They provide opportunities for healthful outdoor recreation, with a minimum of restrictions, for the millions of people who yearly visit the national forests.

h. Nearly 4,000,000 people who live in and near the national forests are supported in whole or in part through the economic development arising through management and utilization of the forests and their resources.

In addition, about 4.3 million acres of land utilization projects are managed under this appropriation item. Resources are being restored and protected and facilities installed and maintained to promote orderly and conservation-wise use of available resources by local people and industries. Of the revenue amounting to about $1.9 million in fiscal year 1959 relating to these projects, 75 percent goes to the Treasury and 25 percent to the counties in which the lands are located.

The Forest Service, as a part of its regular programs, also directs Federal activities and provides technical guidance to States concerned with the prevention and control of fires which might be caused by an enemy attack in rural areas of the United States.

Selected Examples of Recent Progress:

Receipts:

The following table summarizes cash receipts for fiscal years 1958 and 1959:

National Forests	1958	1959	Change, 1959 compared with 1958
Timber.....	$86,274,611	$115,807,988	+$29,533,377
Grazing	3,013,930	3,750,916	+736,986
Land Uses.....	2,257,279	2,588,652	+331,373
Subtotal.....	91,545,820	122,147,556	+30,601,736
Land Utilization Projects	2,290,775	1,919,236	-371,539
Total Receipts.....	93,836,595	124,066,792	+30,230,197
Above amounts include:			
Suspense account, Alaska1/	(267,915)	(587,944)	(+320,029)
Suspense account, O&C Lands 2/.....	(2,572,117)	(3,326,944)	(+754,827)

1/Account established pending settlement of Indian rights on Tongass Forest, Alaska.
2/Account established for Oregon and California railroad grant lands, for which receipts are transferred to Department of Interior for distribution under the Act of June 24, 1954 (68 Stat. 270-272).

Net area of lands under Forest Service administration changed from 181,087,76[illegible] acres as of June 30, 1958, to 181,166,838 acres on June 30, 1959. This is exclusive of about 4.6 million acres of land administered under Title III of the Bankhead-Jones Farm Tenant Act.

Timber Sales Administration and Management

The volume of timber cut in fiscal year 1959 rebounded strongly after the decline of fiscal year 1958. A new high of over 8.3 billion board feet was cut which substantially exceeds the previous high of approximately 7 billion board feet reached in 1957. The last quarter of 1959 closed with cutting at a very substantial rate. Total cut in this quarter exceeded 2 billion board feet and was nearly 50% higher than any previous last quarter.

Comparison of Timber Cut in Recent Years

Fiscal Year	Thousand board feet	Average Stumpage Value per thousand board feet	Receipts from Timber
1950	3,502,000	$8.77	$30,269,202
1957	6,974,000	16.57	106,872,791
1958	6,420,000	14.67	86,274,611
1959	8,341,000	13.65	115,807,988

The volume of timber sold (placed under contract to be cut) exceeded 9.3 billion board feet, in fiscal year 1959.

Reforestation and Timber Stand Improvement

The thirteen nurseries operated by the Forest Service supplied 123 million seedlings and transplants for field planting during fiscal year 1959. Of this total, 54 million were planted on national forest land and the balance supplied to other agencies.

Four of the thirteen Forest Service nurseries were expanded and one was developed and put in production in 1959. Land for an additional nursery also was acquired which will make a total of fourteen nurseries to be operated by the Service.

The following table summarizes major accomplishments in tree planting and timber stand improvement during the fiscal year 1959:

	Treated Acreage (by fund sources)		
	Forest Land Management (appropriation)	Sale Area Betterment (collections) 1/	Total
Planted and seeded (including site preparation)	38,707	73,375	112,082
Measures to obtain natural regeneration (scarifying, controlled burning, rodent control, animal control)	23,222	27,294	50,516
Plantation release	38,545	18,242	56,787
Weeding, thinning, and cull tree treatment in natural stands	55,425	430,116	485,541
Pruning and crop tree release	982	116,792	117,774
Animal control (fence construction, etc., use of repellents for game animals, etc.)	52,519	135,063	187,582
Rodent control (including porcupines)	556,321	40,083	596,404
Disease control and forest sanitation (except blister rust control funds)	25,769	36,276	62,045

1/These are funds collected from timber sale operators for betterment of the sale area as authorized under Section 3 of the Act of June 9, 1930 (16 U.S.C. 576b).

Recreation-Public Use

The national forests received two and one-half times as many visits for recreation in 1958 as in 1950. Sixteen million visits were made for picnicking, 12 million for fishing, 5 1/2 million for hunting, 5 million for camping, and 4 million for skiing and other winter sports. The rest were for swimming, hiking, riding, or just to enjoy forest environment. In all there were 68,449,500 visits in 1958, not counting those who simply drove through and enjoyed the scenery.

The record indicates that the strong growth trend in this important national forest activity will continue.

Year	Recreation Visits to the National Forests
1950	27,368,000
1952	33,007,000
1954	40,304,000
1956	52,556,000
1958	68,449,000
1959 (estimated)	75,000,000

Provisional projections indicate:

1969	130,000,000
1976	230,000,000
2000	600,000,000

To provide for this increasing use, recreation sites must be cleaned, policed, and kept sanitary. Facilities must be maintained and worn-out ones rebuilt, and finally new facilities must be built to accommodate the increasing needs. Increased appropriations under Operaction Outdoors have made it possible to do an adequate job of cleanup, policing, sanitation, and maintenance of existing facilities. There are now 46,700 family units at national forest camp and picnic sites, the majority of which still need to be rehabilitated. Progress in rehabilitating worn-out facilities and building new ones has been appreciable. Thus far 5964 family units have been rehabilitated and 4293 new family units have been constructed. Existing recreation facilities are now being used 80% above their safe capacity. The most acute situations are where new developments such as reservoirs and highways have brought crowds of recreation seekers to locations where no previous recreation use or facilities existed.

Wildlife Habitat Management

Public use of the national forests for fishing and hunting continues to increase. Sportsman visits to the national forests in 1958 were 10 percent over 1957, and 259 percent above 1947.

The following table illustrates the growing importance of the national forests as public hunting and fishing areas.

Fiscal Year	Nationwide Hunting and Fishing Lincense Sales	% Increase Since 1947	National Forest Hunter and Fisherman Visits	% Increase Since 1947
1947	24,687,000		4,944,000	
1951	28,688,000	16	7,755,000	56
1955	33,046,000	34	12,342,000	149
1957	34,195,000	38	16,168,000	227
1958	34,941,729	42	17,742,000	259

Increased appropriations in fiscal years 1957, 1958, and 1959 permitted each Forest Service region to add one or more wildlife technicians to its staff. These wildlife specialists are providing essential leadership and training to district and forest personnel in the maintenance and development of wildlife habitat on the national forests.

On-the-job training in methods and techniques for coordinating wildlife needs with all other national-forest uses has been emphasized. This is a continuing job that expands in importance as the use and management of the national forests is intensified. Substantial progress has been made in the protection of fishing streams and other wildlife habitat values through the coordination of road location and design, logging, and grazing practices, and aerial spraying programs with wildlife habitat requirements.

New cooperative agreements were entered into with New Mexico, Arizona, and Montana. State-financed habitat improvement projects, including several new fishing lakes and involving several thousand acres of national-forest land, were completed. Forest Service participation in the planning, inspection, and control phases of these non-Federal habitat improvement projects has been strengthened.

Cooperative work with the States on joint surveys, studies, and plans for developing wildlife habitat has been expanded. In addition, a small part of the recent increase in Forest Service wildlife funds was used for direct habitat improvement work. Although a modest start, it was the first opportunity for the Forest Service to conduct direct habitat improvement work on the national forests in many years.

Range Resource Management

During calendar year 1958, the following numbers of livestock were permitted to graze on the national forests:

1,114,381 cattle, horses and swine for 5,516,545 animal months

2,608,780 sheep and goats for 7,209,576 animal months

Permits are issued for adult animals only. The offspring of the permitted animals which are under six months of age are allowed to graze without

charge. The total number of domestic animals allowed to graze--permitted stock plus the offspring--is about six million. A total of 30,411 permits were issued for the grazing of livestock under paid and exempt permit. There were also 1,909 private land and 969 crossing permits issued.

The grazing receipts from the national-forest lands in fiscal year 1959 were $3,750,916 as compared to $3,013,930 in fiscal year 1958. Grazing fees are calculated each year by a formula which uses the average price per hundred pounds paid to producers in the western states for beef and lambs. These average prices are determined by the Agricultural Marketing Service. The increases in the average grazing fees per animal month are shown by the following table:

	Cattle	Sheep
1959	50¢	10.25¢
1958	39¢	9.75¢
Increase	11¢	.50¢

Steady progress continues in the analysis of national-forest range allotments to determine their condition and trend, and to prepare revised and improved management plans for their use.

Range Revegetation

During fiscal year 1959, 149,115 acres of depleted rangeland were treated either by seeding or by the removal of competing vegetation. During fiscal years 1951 through 1959, a total of 726,396 acres of national-forest rangeland have been treated by methods which, through research and experience, have proved to be successful. An additional five million acres are in a depleted condition and in need of treatment. As research provides the methods for use on desert lands, high mountain meadows and other areas, the acreage it will be possible to rehabilitate will increase.

Range Improvements

Funds for this work are used to maintain, to the extent possible, the $21,000,000 investment in fences, water developments and driveways which are essential to obtaining better range management and to construct new facilities.

The following were constructed in fiscal year 1959:

531 miles of fence
26 miles of driveways
536 (each) water developments

Permittee cooperation in the maintenance and construction of range improvements increased $72,000 to an estimated total of $684,000.

Soil and Water Management

Work done specifically to improve water-sheds and restore damaged, eroding lands was extended to include one or more projects on each of 80 national forests. For example, in California on the Plumas National Forest the Last Chance erosion control project, a cooperative endeavor, is receiving considerable favorable comment from recreationists, stockmen, irrigationists and others interested in watershed restoration. Reconstruction of old CCC dams and installation of new structures has stabilized channels, stopped erosion, and raised the water table. Forage in the meadow has benefitted, and ponds created by the dams now provide excellent trout fishing.

On the Sequoia National Forest in California, the Dwyer-Rucker Exchange lands typified the extreme abuse of highly erodible soils by uncontrolled logging. Rehabilitation has been accomplished in this area by treatment of old skid roads to stop erosion, putting abandoned logging roads to bed, and eliminating temporary stream crossings from old logging roads.

In Alabama on the Oakmulgee Ranger District of the Talladega National Forest, annual reinforcement and maintenance was accomplished on a series of gullied areas. This work consisted of fertilizing, placing small obstructions of earth, rock, or brush to trap sediment, seeding bare spots, and planting trees and other vegetation as needed to promote soil stabilization. As a result of this work, a marked reduction has been obtained in flood water runoff and in soil movement and sediment contribution to stream channels.

In Wyoming restoration work on critical flood source areas on the North Fork of Swift Creek watershed, Bridger National Forest, was started in 1958. Swift Creek, which flows through the town of Afton, furnishes water, including irrigation needs, to the residents of Afton and vicinity. Two hydroelectric plants are located on the stream. Sediment carried downstream from depleted areas as a result of summer rains has caused extensive damage, especially to the town's water distribution system including plumbing fixtures in homes. At such times the water is not fit for human consumption. The Swift Creek watershed in years past had been heavily grazed. The entire watershed was closed to grazing in 1950 with the full cooperation of the local people. Although marked improvement of the vegetal cover has occurred since then, some areas were so badly depleted that restoration work consisting of contour trenches, gully plugs, and seeding was necessary to prevent rainstorm floods.

In Oregon moving sand dunes along the Pacific Coast cover forests, threaten the coastal highway, endanger private property, impede navigation on the Siuslaw River, fill lakes used for recreation, cover campgrounds and cause flooding of farm and pasture lands. Many thousands of the estimated 50,000 acres of dunes on the Oregon coast are within the Siuslaw National Forest. The Forest Service has successfully controlled some 800 acres of moving sand in critical areas by planting of grasses, shrubs, and trees. Costs vary from $30 to $300 per acre depending upon local topography and method of planting. Techniques and methods are well developed.

The pilot area phase of the national forest soils program has expanded rapidly until all regions, except Alaska, are staffed with soils men and have pilot area surveys in progress. Fourteen pilot areas have been started. Soil surveys have been completed for four areas totalling approximately 550,000 acres. In addition to the resource information being obtained in the pilot survey program, rangers and other field men in the vicinity of the projects are getting valuable

training in soils as they jointly work with the soil specialists in preparing multiple-use management plans from the field data.

In Arizona the program to evaluate the effects of pine stand modification, juniper control, and clear cutting is well under way on the 276,000 acre pilot study area on the Beaver Creek project, Coconino National Forest. Stream gages and precipitation gages have been established in 14 watersheds. After a period of calibration, the areas will be subjected to various vegetative treatments or practices to determine the effect on water production. One small watershed of 150 acres has been completely converted from trees to grass, and a pine stand of 2,300 acres in another watershed has been thinned to the prescribed 80 square feet basal area. Approximately 50,000 acres are planned for juniper control and 100,000 acres for pre-commercial thinning of pine stands. In California preliminary clearing work is essentially completed in Monroe Canyon, Angeles National Forest, on the cooperative program between Los Angeles County and the Forest Service. Although it is too soon to draw sound conclusions, the removal of riparian woodland growth from Monroe Canyon is already showing some striking results in increased streamflow.

The Bull Run watershed in the Mt. Hood National Forest, which supplies municipal water to Portland and adjacent cities, was set aside as the Bull Run Reserve by President Harrison in 1892. For over 60 years it was closed to entry except by Forest Service employees on official business and employees of the city water department. During this period it was protected from fire, but no progress was made in land management of the area. Recently the city and Forest Service signed an agreement whereby the latter manages the city-owned forest land in the watershed. In addition to the removal of road right-of-way timber and snags from the watershed, one timber sale for about 11 million board feet of timber is nearly completed and another has been advertised for 17 million board feet. Stipulations have been included in the sale contracts which provide that essential attention is given to maintain proper soil stabilit and sanitary conditions during the logging operations and that subsequent mainte nance is accomplished as needed.

Mining Claims, Mineral Permits, and Leases

A major activity continues to be the determination of surface rights of mining claims under the Act of July 23, 1955, (P.L. 84-167) as shown by the following summary of progress to June 30, 1959:

Item	Number of Areas	Acres	Estimated Number of Mining Claims
Surface right determination to be done (revised estimate).....	1,000	110,000,000	1,250,000
Field examination during 1959....	181	23,300,000	255,400
Total field examinations completed 6/30/59.....	444	52,900,000	533,400
150-day publication period expired	337	39,400,000	427,200
Determination job complete.....	109	12,300,000	100,300

As a result of determination of surface right procedure there are now 12,500 mining claims on which the claimants have asserted the validity of their surface rights. These claims are now being examined by the technical mineral examiners to determine their validity. That means that on about 40,000,000 acres of national-forest land which included an estimated 427,000 mining claims the United States has the right to manage the surface, on all but 12,500 claims, and some of those may be resolved in favor of the United States.

Mineral permits and leases for oil and gas, coal, oil shale, potassium, sodium, phosphate, and sulfur on both public domain and acquired national-forest lands are issued by the Bureau of Land Management but only with the advice or consent of the Forest Service. The Forest Service makes an impact analysis on all applications to determine the effects mineral exploration and development will have on watersheds, recreation, and other surface uses and whether the use should be authorized or denied.

Special stipulations are developed to protect, restore, and rehabilitate the land and to safeguard other surface values. The Forest Service supervises the land management protection, restoration, and rehabilitation provisions of all leases and permits.

The volume of mineral leases on national-forest land reserved from the public domain has increased from 3,064,097 acres in 1951 to 9,343,649 acres in 1957, and is still increasing. The receipts are not credited as national forest receipts. However, mineral receipts from national forest acquired lands were $1,138,110 for fiscal year 1959. These are credited as national forest receipts.

Development of properties under lease and new properties will require increased supervision. Strip mining creates difficult land use and protection problems. Road construction, location of improvements, construction of dams and reservoirs, protection of soil, water, and other surface resources, and fire protection require continued vigilance.

Miscellaneous Land Uses

National-forest land may be used for special purposes when such uses are in the public interest. About 36,700 special-use permits for more than 100 different purposes are now in effect. Included are pastures, sawmills, television transmitters, roads and other desirable uses. This does not include some 21,700 permits authorizing recreational uses such as resorts, ski lifts, organization sites, etc., which are considered under the Recreation-Public Use function.

Special-use permits are issued to individuals, local government agencies, nonprofit groups, and commercial organizations.

Permits to public agencies are issued free, and those of a non-profit nature to organizations are for a nominal charge. For commercial permits and individual permits a fee is charged based on the value of the land for the purpose. Careful administration of special uses is necessary to prevent damage to other important national forest values and to insure fair return for use of the land. Fees for special land uses totaled $1,450,542 in 1959.

The special use activity is increasing as the population grows and as industrial and other needs for use of land spreads on the national forests. River development projects, major highways, and other large developments increase the need for special-use permits and in many cases cause difficult adjustment problems by requiring removal of existing permitted uses.

Mapping

Good progress was made in fiscal year 1959 in extending the map and aerial photographic coverage of the national forests which is needed for the protection, development, and multiple-use management of their lands and resources. Planning maps of 18,835 square miles and standard topographic maps of 580 square miles of national forest and boundary areas were completed and contracts were awarded for aerial photography of 56,336 square miles.

Land Exchange

Congress has passed about 90 laws authorizing the exchange of national forest land and timber for private or state lands intermingled with or adjacent to the national forest. The principal objective of these laws is to promote consolidation of the national forests for more effective land and water conservation, greater public service and more efficient management. In carrying out this program, emphasis is placed on (a) the exchange of scattered or isolated parcels to facilitate needed modification of national forest boundaries, to reduce the mileage and cost of property line surveys, and to simplify national forest administration; (b) exchanges to block in areas where national forest and either private or state lands are checkerboarded or intermixed; and (c) transactions to make available national forest lands needed and suited for community or industrial purposes. During the year ending June 30, 1959, 79 exchange transactions were approved. In these transactions, 86,477 acres will be granted to the Government and 39,607 acres will be conveyed by the Government. These exchanges will block in national-forest lands and will help to consolidate or build up private properties or state conservation units.

Management of Land Utilization Projects

As of June 30, 1959, the Forest Service had responsibility for administering, under Title III of the Bankhead-Jones Farm Tenant Act, about 4.6 million acres of Federal lands in 67 separate projects, located in 27 states and Puerto Rico. Of the 4.6 million acres now administered by the Forest Service 4.2 million acres are lands retired from cultivation and revegated to grass or native grasslands which need careful grazing management and control. During calendar year 1958, 4,859 permits were issued covering the grazing by 237,572 cattle and horses and 89,295 sheep. The other lands are forested from which approximately 37 million board feet of timber and timber products were harvested during the year ending June 30, 1958. Other permitted uses of these lands include operation of recreational areas; limited amounts of cropping, haying, and grass seed harvesting, under agreements and permits issued by the Forest Service; and extraction of oil, gas and other minerals under mineral leases and permits issued by the Bureau of Land Management, Department of the Interior. In 1958, over a million visits were made to

these lands for hunting, picnicking, camping and other recreational use. During fiscal year 1958, 8 land exchanges were approved involving Bankhead-Jones Act lands, to promote better consolidation of ownership and so facilitate management and conservation activities. In these, the Government will convey 4,918 acres and will receive 4,813 acres.

Forest Fire Control

The continuing heavy demand for forest products and water, along with increasing recreation and other uses of the national forests, results in increased fire hazard and additional risk of fires starting. As resource and improvement values get higher, and public use increases, forest fire control becomes increasingly important. Successful accomplishment of this essential job requires more manpower, equipment, research and development of improved fire control techniques and methods.

The 1958 Fire Season

Western regions had average to extremely high fire danger with longer than normal seasons. The severe drought of the past several years in Southern California continued through the entire year. In the Pacific Northwest Region the fire season was one of the hottest on record and the most severe since 1951. Northern Washington forests experienced the driest season in their history. The season in Southeastern Alaska was one of the driest on record. In the Lake States of the North Central Region, fire danger was critical during the spring season. Fall burning conditions in the Eastern Regions were generally easy with numbers of fires and area burned below the 5-year average.

There were 11,085 fires on national forest and other land within and adjacent to the forests, compared to 7,217 in 1957 and a 5-year average of 10,058. Lightning fire occurrence was the third greatest in the past 25 years and exceeded the 5-year average by 32%. Although the fire season was more severe than usual, man-caused fires did not greatly exceed the record low number for 1957. A definite downward trend in man-caused fires is noted when comparing the 1949-1953 average of 5,911 with the 1954-1958 average of 4,544. Area burned was 116,453 acres compared to 141,191 acres burned in 1957 and the 5-year average of 244,125 acres. This favorable record can be attributed, in large part, to greater use of aerial equipment and chemicals. An otherwise successful fire season was marred by the death of 13 persons while engaged in fire control activities. Ten of these were employed by the Forest Service and three were pilots of contract aircraft. In California, 3 men burned to death on 3 separate fires; 1 man was struck by lightning; and 5 men, all pilots, were killed in airplane crashes during air tanker operations on 3 separate fires. In the State of Washington, 4 men were killed in an airplane crash while engaged on a cargo dropping mission.

1958 Progress and Program Emphasis

A current nationwide fire planning project is designed to determine scientifically the organization required to attain the standards of fire control needed to meet current resource management objectives. The latest data, research results, new techniques and equipment are being used in this study. Target date for completing final plans is December 31, 1960.

In cooperation with equipment manufacturers, pumps, mixers, tanks, and other special equipment have been developed to handle fire retardants for aerial attack. Increased fire equipment standardization and specification work has led to improved performance and serviceability of equipment.

Development and application of a stepped up safety program for fire fighting moved ahead rapidly during the year. Servicewide, regional and forest training was conducted in fire behavior. Increased use was made of special films in the training programs. Aluminized suits for fire fighters were tested in cooperation with the Army. A project was established to develop suits, ponchos and blankets of heat reflecting and resistant materials, and breathing devices. Cooperation with the Quartermaster Research and Development Command is being continued.

An Air Operations Handbook was completed and a Fire Control Handbook was practically completed. Two supplemental handbooks, Fireman's Guide, and Air Tanker Guide were completed for printing.

More attention was directed toward prevention of man-caused fires. Success in reducing man-caused fires on the Mississippi National Forests with funds provided in the "Increased Manning Experiment" demonstrated a need to expand prevention efforts on a broad front. Special funds were provided for this work on the Louisiana, South Carolina, and Tennessee National Forests and in Southern California.

New standards for classification of Fire Control Aids and Technicians were established. This will assure stability and career opportunity for the many sub-professional people employed in fire control work, and will promote greater organizational effectiveness.

Aggressive investigation of man-caused fires, and subsequent law enforcement action, given special emphasis and attention. Trespass action initiated on 636 fires resulted in 119 criminal convictions, and 300 civil settlements amounting to $349,393. At the end of the year, 262 cases, some from previous years, were pending.

Construction and Maintenance of Structural Improvements.

These funds cover structural improvements and communication systems for general administrative purposes, including fire control, under the national forest protection and management activity.

Improvements to be maintained are selected on the basis of most urgent needs within classes of improvements, such as lookouts, housing, storage, facilities, offices, telephone lines, radio systems, etc.

Construction funds have been used to meet urgent needs for replacement or betterment of existing improvements and for urgent additions. Priority has been given to construction of dwellings and barracks to house employees in

localities where private rentals are not available. Construction and betterment of the following improvements was accomplished during fiscal year 1959:

	Number of Units (by Fund Sources)					
	Construction			Betterment		
Type of Building	National Forest Protection and Management Activity	All Other Funds	Total	National Forest Protection and Management Activity	All Other Funds	Total
Dwellings & Barracks.	195	38	233	119	29	148
Fire Lookouts.....	33	--	33	24	--	24
Service & Storage Buildings - All Types	102	42	144	53	19	72

Fighting Forest Fires

Current Activities: This program covers fire fighting on the national forests and the build-up of emergency fire fighting forces under peak burning conditions. Experience has demonstrated that material savings are made by having a strong force ready to discover, attack and stop fast-spreading fires while they are small. Expenditures for the regular fire control organization are financed from the activity "National Forest Protection and Management." The temporary build-up in forces when fire conditions are critical and the suppression of fires is financed from the "Fighting Forest Fires" fund.

Significant Fire Control Facts - 1958

1. There was more use of fire retardants in direct air attack in support of ground forces. Many of the lessons learned and techniques developed or proposed as a result of the 1957 experience were applied in 1958. Techniques and methods of application of fire retardants were greatly improved, with particular emphasis on safety of operations through better organization, equipment and pilot requirements, and radio communication. Operations were expanded to the Southwest and North Central Regions and a Forest Service owned air tanker was assigned to the Eastern Regions. Some 74 air tankers were available to all protection organizations. The Forest Service used air tankers on 322 fires on which more than 1,500,000 gallons of fire retardant mixture was applied, compared to 1957 use of 640,000 gallons on 100 fires. The effectiveness of this attack improves as experience is gained, new techniques are developed, and more efficient aircraft made available. The use of fire retardants was an important factor in holding area burned to less than one-half of the 5-year average.

2. Helicopters were flown 3,746 hours, transported 11,508 people and 362,642 pounds of cargo. In hours flown this was an increase of 51% over 1957. Helicopters of larger capacity and better performance characteristics are becoming available, and wider use is being made of them. They are gradually expanding operational areas and increasing speed and strength of attack. They were used extensively to move ground personnel, and in replacing and retrieving smokejumpers. One region estimated that helicopters increased the efficiency of its smokejumper unit by one-third or more. The helicopter initial attack study and program in Montana and South Dakota showed good results. This method of attack reduces travel time and fatigue of firemen, speeds up their return and enables fewer men to handle more fires. It was used extensively in the Pacific Northwest Region, and was credited with material savings in fire fighting costs and area burned.

3. Greater use was made of smokejumpers than any year in the history of this method of attack. During the season 2,251 jumps were made to 788 fires. In 1957 they made 1,497 jumps to 319 fires.

4. Aircraft (including helicopters) were flown 26,417 hours in fire control work and carried 25,220 passengers, an increase of 5,480 hours and 10,253 passengers over 1957. Of the total use 82% was of commercial privately owned aircraft. Approximately 1,500,000 pounds of cargo were transported.

5. The Pacific Northwest Region experienced one of its most severe fire seasons and had unusually frequent spring and summer lightning storms. The severity of fall weather in Washington was above average, and in Oregon the mid-September-October period was in some respects the most severe since 1936. Utah and Nevada experienced the driest 6-month period in Weather Bureau history. Normal precipitation, May through October, is 6.05 inches, but only 0.87 inches was recorded at Salt Lake City for this period in 1958. In the California Region the fall months were recorded as the driest, statewide, in the last 108 years, and lightning fire occurrence was the greatest in the history of the region. The severe drought of the past several years in Southern California extended through the entire year of 1958. Fire danger in the Lake States was critical during the period March 16 to June 1, and an unusually large number of fires occurred on the Chippewa Forest.

Insect and Disease Control

Current Activities: The purpose of this program is to reduce losses caused by destructive insects and diseases to tolerable levels through preventing, retarding, suppressing or eradicating incipient, potential or emergency outbreaks on or threatening all forest lands irrespective of ownership.

Insects and diseases cause an estimated annual loss of 7.8 billion cubic feet of wood. The Lea Act approved April 26, 1940 and the Forest Pest Control Act approved June 25, 1947 were enacted in recognition of national concern and Federal acceptance of shared responsibility in reducing insect and disease caused losses to the Nation's forest resource. The Lea Act specifically authorizes control of the white pine blister rust disease, while the Forest Pest Control Act authorizes control of forest insects and other forest diseases. Responsibility for administering both Acts is vested in the Secretary of Agriculture with responsibility specifically delegated to the Chief, Forest Service. It includes detecting forest insect and disease outbreaks; evaluating their seriousness and need for control; providing leadership and cooperation in the control of outbreaks on non-Federal lands; reducing losses on national forests through prevention and suppression of destructive outbreaks; and cooperating with other Federal agencies responsible for control activities on forest lands under their jurisdiction.

Native insects and some diseases are normally held in check by parasites, predators, disease organisms, and weather conditions adverse to their development. Occasionally the natural balance between a forest pest and the factors that tend to keep it under control are upset, allowing a destructive insect or disease to develop into damaging epidemics. Another cause of epidemics is the accidental introduction of insects or diseases from abroad. Often such insects or diseases are especially destructive for our native trees have no natural resistance to foreign pests and predators, parasites and disease organisms holding them in check in their native habitat are absent in the new one. Regardless of cause, preventive and suppressive measures are necessary to suppress outbreaks of pests that reach damaging proportions.

Reduction of losses caused by insects and diseases is accomplished by adopting practices directed at preventing pest problems from developing and by prompt suppression of controllable insect or disease outbreaks that do develop. Prevention is accomplished by creating or maintaining through proper resource management conditions unfavorable to the introduction or development of forest insects and diseases. Suppression or eradication is accomplished by (1) early discovery and biological evaluation, (2) pre-suppression surveys to determine area or number of trees to be treated, costs and economic justification, (3) preparation of a plan of action either by harvesting, by timber stand improvement, by application of chemical measures or by combinations of these methods, and (4) prompt application of selected suppression measures during a period when the insect or disease is most vulnerable.

Selected Examples of Recent Progress - calendar year 1958

White Pine Blister Rust Control

1. Initial work was done on 80,501 acres.
2. Rework was done on 230,180 acres.
3. Maintenance work was done on 1,397,844 acres.
4. Ribes destroyed totaled 14,717,495.
5. Survey work to determine pine stocking and ribes regeneration was done on 2,771,883 acres.
6. Sixty-four camps were established and operated and 2,218 seasonal workers employed. In addition, 625 contracts for control work on 40,820 acres were awarded on a competitive basis.
7. States, counties, towns, and private owners continued to participate in a cooperative control program on non-Federal land with a total contribution of $733,633.
8. Progress was made in developing antibiotic fungicides for use in controlling white pine blister rust in north Idaho. About 300,000 infected western white pine were individually treated at a cost of approximately five cents per tree. Results were so outstandingly good that approximately 2-1/2 million trees will be individually treated in calendar year 1959. Aerial application of promising fungicides is also being tested and individual tree treatment is being tested in other white pine regions.

Insects and Diseases Other Than Blister Rust:

Detection and Appraisal Surveys:

Forest Diseases

Pole blight exterior range limits static since 1953. An aerial resurvey to determine the current distribution of western white pine pole blight disclosed no extension in the range of the disease beyond that known in 1953. Affected centers were found in four stands that were previously healthy but within the pole blight range and several instances of new occurrences in stands surrounding old diseased centers were found.

Oak wilt not advancing southward. Fringe surveys disclosed oak wilt infections in three additional counties in eastern Tennessee and two new counties in northern Arkansas but these findings did not extend the known general range of the disease. Oak wilt has not yet been detected in western Tennessee, northern Alabama, northern Georgia, northwest South Carolina, nor anywhere in Mississippi.

Maple blight not building up significantly. Intensive surveys disclosed maple blight in only two additional small areas in Iron County, Wisconsin. It is still generally confined to the 10,000 acre tract where originally discovered in Florence County in 1957 and even there did not build up appreciably in 1958. No known maple pathogens have been discovered associated with the problem.

Cone rust damage severe again in 1958. Cone rust was even heavier in 1958 on slash pine in the South than it was in 1957 when 18% of the cones observed were diseased. The rust appeared to be more prevalent where evergreen oak (alternate host) and susceptible pines were growing in association close to low, wet areas. Pines on dry ridges were not as heavily infected, suggesting rust damage might be minimized by proper site selection for seed production plantings.

Southern forest tree nurseries inspected. Inspection of all private, State, and Federal forest tree nurseries in the South disclosed root rot caused by fungi and nematodes to be a common problem. Use of soil fumigants to control these diseases was recommended. Fusiform rust ranked second in seriousness among nursery diseases, particularly in Mississippi and Louisiana, pointing up the need for increased research effort to improve control methods.

New disease survey system adopted by Pacific Southwest Station. Temporary, randomly located sample plots are now being used instead of a system of permanent plots to determine the distribution, progress, and severity of forest tree disease losses in California. Dwarf mistletoes were recorded on about half of the 125 plots examined throughout the State and heartrots were found in trees on 85% of the plots.

Forest Insects

Public and private landowners and land-managers intensify surveys to discover outbreaks of destructive forest insects. Public and private foresters owning or managing forest lands intensified their survey efforts to discover forest insect outbreaks in their early stages. This was followed by a stepped-up program of on-the-ground evaluation of outbreaks as a basis for determining the needs for suppressive controls.

Outbreaks of Douglas-fir tussock moth discovered in New Mexico. For the first time on record, outbreaks of the Douglas-fir tussock moth were discovered in the fir forests of New Mexico. The outbreaks were found at two widely separated locations and each one will require suppressive controls to preserve the forest resources affected.

Natural factors cause collapse of large-scale outbreak of spear-marked moth in Alaska. A virus disease and insect parasites caused a sharp decline in severity of spear-marked black moth infestations in the vicinity of Fairbanks, Alaska. Because of the control effectiveness of the virus disease and the parasites, it was not necessary to suppress the population with insecticidal sprays.

Surveys reveal light infestation of pandora moth in pine stands of eastern Oregon. A light infestation of the pandora moth, a severe pest of ponderosa pine, was discovered in eastern Oregon at

a location where the insect occurred in outbreak proportions 25 years ago. The scope and severity of the newly discovered investation is not yet known. The former outbreak subsided from natural factors before causing appreciable damage.

Spruce and fir bark beetles epidemic in fewer areas than in prior years. The destructiveness of the Engelmann spruce beetle in the Rocky Mountains and the Douglas-fir beetle in the Pacific Coast States is reduced from levels of the past several years. However, new outbreaks of the former were discovered early in the year on portions of three national forests in northeastern Utah; also, the Douglas-fir beetle showed up extensively in southwestern Oregon during the spring months. Action to suppress outbreak populations of both of these species of spruce beetles was initiated and is being continued.

Spruce budworm infestations severe over large acreage of mixed-conifer forests from coast to coast. Surveys have revealed extensive infestations of the spruce budworm in many areas, country-wide. A gross area of 3,521,700 acres is affected in the northern Rocky Mountains; increasing infestations, currently confined to 372,000 acres, occur in southern Colorado and northern New Mexico; some 1,300,000 acres are infested in Minnesota; nearly 3,000,000 acres are affected in Maine; and 315,000 acres are infested in eastern Oregon.

Black-headed budworm active again in hemlock and spruce forests of coastal Alaska. After the lapse of only two years since black-headed budworm infestations collapsed on some 21 million acres of hemlock and spruce forests in coastal Alaska, the insect was again found to be causing light to moderate defoliation in the vicinity of Ketchikan. Increased budworm activity is expected at other locations in southeast Alaska during 1959.

New outbreak of pine butterfly discovered in pine stands of Idaho. Surveys revealed that pine butterfly infestations occurred on some 50,000 acres of high value ponderosa pine stands on a portion of the Salmon National Forest in Idaho. Damage to host trees was not great during the spring and summer months but egg deposition in the affected area is sufficient to cause concern that a new large-scale epidemic may be in the making.

Epidemic of lodgepole needleminer continues unabated in high elevation forests in California. The epidemic infestation of lodgepole needleminer which has persisted for the past several years at Tuolumne Meadows, Yosemite National Park, California, continued unabated at that location and spread to adjacent areas as well. The forest stands affected by the needleminer are threatened unless populations can be reduced by insecticidal sprays. Helicopter spraying is being conducted in a portion of the infestation area.

Damage by the balsam woolly aphid decreases in Pacific Northwest but increases in Northeast and Southeast. Surveys have revealed a decrease in the intensity of balsam woolly aphid infestations in the fir stands of Oregon and Washington. However, aggressive bole infestations late in the season indicate that the infestations may increase in severity during the current year. Aphid infestations in the Northeast increased in scope and severity throughout most of Vermont and in the White mountain National Forest in New Hampshire. Infestations also increased in severity in North Carolina. Major efforts were made during the year to introduce predaceous insects from Europe and Japan for biological control of this destructive pest.

Scope and severity of defoliation of hardwoods by elm spanworm increased in southeastern States. Surveys revealed that defoliation of hardwoods by the elm spanworm in the mountains of Georgia, North Carolina, and Tennessee occurred on a much larger acreage in 1958 than in prior years. Severity of defoliation also increased and suppressive control was undertaken in limited areas of high recreational values to preserve the resources affected.

Surveys reveal wide-scale prevalence of insects affecting pine plantations. Twig and terminal-feeding insects affecting conifers in areas being regenerated by planting were found to be particularly prevalent at many locations in all sections of the country. Suppressive action for control of such major pests as the white pine weevil, European pine shoot moth, and several other species of weevils and moths was undertaken on a great number of small parcels of land in many States.

Control Accomplishments - calendar year 1958

Insect control projects were conducted on 65 national forests in 26 States and on 30 national parks and monuments, and Federal-State-private owner share-the-cost projects were carried on in 9 States. Through these projects, the following accomplishments were achieved:

1. 789,370 infested trees, cull logs and stumps were chemically treated to control barkbeetles.
2. 1,231,911 acres were aerially sprayed for spruce budworm control. Of this total, 368,927 acres were on State and private lands, 33,000 acres were on Department of the Interior lands, and 829,989 acres were on national forests. Control costs were reduced from $1.00 per acre in 1957 to $0.75 per acre in 1958. Attention and care was given in the application of insecticides to prevent possible damage to fish and wildlife.
3. 35,959 acres were treated for suppression of small outbreaks of such miscellaneous insects as Great Basin tent caterpillar, sawflies, Douglas-fir tussock moth, spittle bugs, pine weevils, and others.

4. Over one billion board feet of dead, dying, infested or insect-susceptible timber were cut through commercial sales on national forests as insect outbreak prevention and suppression measures.

The following table summarizes control accomplishments in the calendar year 1958:

Land ownership	Bark beetles	Spruce budworm	Miscellaneous forest insects
	Trees Treated 1/	Acres Treated	Acres Treated
National forest and other Federal	780,039	862,984	27,959
State, county, municipal, and private	9,331	368,927	8,000
Total	789,370	1,231,911	35,959

1/ Includes infested trees, cull logs, and stumps.

Cooperative oak wilt control programs were carried on with the States of Pennsylvania, Virginia, West Virginia, Kentucky, Arkansas, and North Carolina. The States contributed from 66-2/3% to 75% of survey and control costs on non-Federal land. Approximately 35 million acres of non-Federal land and 1-1/2 million acres of national forest land were aerially surveyed to detect for control purposes infected oak. A total of 3,621 infected trees were located and given control treatment.

Obligations, Forest Pest Act Control Projects

Fiscal Year 1959, and Estimates for Fiscal Years 1960 and 1961

Projects	1959	1960 (estimated)	1961 (estimated) 1/
Bark beetles			
Montana-Northern Idaho	$135,959	$72,000	50,000
Colorado-Wyoming-South Dakota	76,655	108,560	75,000
Arizona-New Mexico	---	---	10,000
Utah-Nevada-Wyoming-Southern Idaho	1,156,948	1,163,540	800,000
California	118,295	135,360	106,000
Oregon-Washington	---	32,000	25,000
Maine	---	2,000	---
Southern-Southeastern States	154,279	206,000	150,000
Defoliators			
Montana-Northern Idaho	154,500	166,000	331,000
Colorado	---	40,600	50,000
Arizona-New Mexico	24,734	11,000	220,000
Utah-Southern Idaho	---	---	300,000
Oregon-Washington	44,500	---	32,000
Maine	8,100	50,000	---
Southern-Southeastern States	4,221	28,600	21,000
Minnesota-Michigan-Wisconsin	39,758	89,165	25,000
Forest tree diseases			
Eastern States-Oak wilt	76,994	99,300	99,000
Western States-Dwarfmistletoe	17,065	46,750	51,000
Miscellaneous Forest Service Projects and Pre-control work 2/	290,735	391,475	400,000
Department of Interior Insect and Disease Projects	127,278	267,650	165,000
Subtotal, Control Projects	2,430,021	2,910,000	2,910,000
Detection and Appraisal Surveys	780,306	718,100	725,000
Unobligated balance	76,573	---	---
Total available or estimated	3,286,900	3,628,100	3,635,000

1/ Financial needs for projects are forecast one or more years in advance of anticipated use. They are subject to fluctuations and adjustments are required between projects depending on the discovery of new outbreaks and expanded needs on approved projects.

2/ Included in this item are funds for administration of the Forest Pest Control Act for continuous pre-control activities, and for quick action on many projects across the United States to stop outbreaks while they are small. Involved are cone and seed insects, plantation insects, pests of reproduction and second growth, and other forest insects and diseases.

DEPARTMENT OF THE INTERIOR

Insect and Disease Control Projects

Prevention of serious losses from diseases and insects in the forests under the jurisdiction of the Department of the Interior is an important activity under the Forest Pest Control program. Approximately 183 million acres of forests and woodlands are administered by the Department of the Interior, including 7 million acres by the National Park Service, 1 million acres by the Bureau of Sport Fisheries and Wildlife, 14 million acres by the Bureau of Indian Affairs, 36 million acres by the Bureau of Land Management in the continental United States, and 125 million by that Bureau in Alaska.

White Pine Blister Rust Control

The objective of the White Pine Blister Rust Control program is to protect the valuable white pine forests from the ravages of the white pine blister rust, a fungous disease of foreign origin. There are 585,106 acres of control area administered by the Department of the Interior, of which 375,404 are under the direction of the National Park Service, 67,809 under the Bureau of Land Management, and 141,893 under the Bureau of Indian Affairs.

In the calendar year 1958, the National Park Service, the Bureau of Land Management, and the Bureau of Indian Affairs collectively destroyed 1,371,603 ribes on 26,639 acres, of which 12,527 were initially worked and 14,112 reworked. Of the total control area, 456,438 acres or 78% is on a maintenance basis.

The National Park Service is rapidly completing initial work on all control areas, including the northern Rocky Mountain parks where outstanding samples of limber, foxtail, and white bark pine will be given protection from the advancing disease. Approximately 81% of the total control area within the parks and monuments is now on maintenance.

The Bureau of Land Management increased its control area in western Oregon during the year by 8,846 acres. Of the total control area over 52% is now on a maintenance basis.

The Bureau of Indian Affairs continued its control action in the Lake States. Most of the ribes work on the Menominee Reservation is being accomplished by Indian women. Contract eradication was used for the first time on Indian lands in calendar year 1958. Of the total control area, 97% has been worked initially and 82% is now on maintenance.

Control of Insects and Other Diseases

For many years a program to maintain a low level of infestations and infections and to prevent epidemics within the intensively used scenic and recreation areas of the national parks has been successful in conserving these valuable forests. A number of relatively small but nonetheless important projects are involved in this program. Most of these projects require annual attention to maintain the forests in a healthy condition. Examples of these projects are the bark beetles in the California national parks, the defoliators in the southwestern national parks and monuments, dwarfmistletoe in Grand Canyon National Park, and the oak wilt at Effigy Mounds National Monument. Likewise, there are minor projects of a recurring nature at some of the Indian reservations, examples of which are the walkingstick and spittlebug infestations at the Menominee Indian Reservation and the Great Basin tent caterpillar at the Navajo Reservation.

Major projects are under way to control serious insect infestations and prevent widespread destruction of the forests in three western parks. These include mountain pine beetle control work within Grand Teton, Lassen Volcanic and Yosemite National Parks, and an aerial spray project to reduce the lodgepole needleminer infestation on 4,000 acres within the scenically important Tuolumne Meadows section of Yosemite National Park. Also pilot control projects of major significance but considerably lesser scope are being carried out to develop practical control methods against the white fir needleminer at Bryce Canyon National Park, the Southwestern pine beetle at Bandelier National Monument and pinyon bark beetle and scale at Grand Canyon National Park.

The Bureau of Indian Affairs will conduct a second treatment on an experimental area designed to test the effectiveness of control of dwarfmistletoe on the Mescalero Reservation. Through a survey made to determine the extent of the spread of this parasite it was found to be widespread on the Fort Apache Reservation.

Quite frequently infestations involving the forests of this Department likewise concern adjacent forest areas. The following are examples requiring coordinated control:

Mountain pine beetle outbreak in Grand Teton National Park and the adjacent Grand Teton National Forest.

Spruce budworm on 93,411 acres in Montana where public domain forests are intermingled with private lands and lie adjacent to national forests.

Bark beetle infestation at Bryce Canyon National Park and the adjacent Dixie National Forest.

Mountain pine beetle infestation which involves a total of 45,000 acres of public domain forest lands and State and private forest lands in northern California.

Bark beetle outbreak in sections of Sequoia and Kings Canyon National Parks and adjoining Forest Service, State and private lands in California resulting from the McGee Ranch fire of 1955.

Pilot test project to control balsam woolly aphid which involves Great Smoky Mountains National Park, Blue Ridge Parkway, adjoining national forest, State and private lands in the State of North Carolina.

Acquisition of Lands

These funds are used to acquire lands for the protection of the watersheds of navigable streams and for the production of timber under the provisions of the Weeks Law of March 1, 1911, as amended (16 U.S.C. 513-519, 521). There are now 55 national forest and purchase units situated in 29 States and Puerto Rico within which acquisition of lands under the above Acts has been approved by the National Forest Reservation Commission and in which lands still remain to be acquired. All but a few of these units are east of the Great Plains.

In the fiscal year 1959, 51 tracts containing 6,007 acres were approved for purchase under the Weeks Law. Such tracts were located in 14 national forest units in 12 States. These were parcels needed to meet specific administrative and resource conservation needs, such as assurance of rights-of-way, reduction of need for property surveys, or to consolidate blocks of national-forest lands to facilitate protection and management. Purchase of such lands will result in increased efficiency and economy in administration of, and increased public benefits from, national-forest lands. There are many more similar key tracts surrounded in whole or in part by national-forest land and most valuable for national forest purposes which need to be acquired.

FOREST RESEARCH

The Forest Service conducts research on problems pertaining to all forest land and on the management of related non-forest rangelands, including State and private holdings as well as national forests and other Federal lands.

The research is carried on primarily at the Forest Products Laboratory, Madison, Wisconsin, at nine regional forest and range experiment stations in the continental United States, and at forest research centers in Alaska and Puerto Rico. Much of the research at the regional stations is concentrated at laboratories and at field research centers including experimental forests and ranges where major problems may be studied advantageously.

The research is to a large extent cooperative with States and private agencies. The following fields of research are under way:

Forest and Range Management Research

Current Activities: Research under this activity is concerned with the growing of timber and the management of forest properties, the management and efficient use of range forage, the management of both forest and range vegetation to produce the greatest amount of usable water and to minimize erosion, and the management of forest recreation resources.

Research in forest management emphasizes the development of methods for quickly increasing the growth rate of forests and hence the permissible annual cut. Emphasis is given to harvest cutting patterns that promote regeneration of the forest or increase growth and quality of residual stands. Also being stressed are measures leading to control of undesirable vegetation competing with crop trees. Methods of reforesting farm lands withdrawn from cultivation, stripped mining lands, and cut or burned-over forests, are being improved through research. The development of hybrid trees for faster and more certain timber production is being studied, as well as improved methods for stimulating gum flow in pines for the production of resin.

Wildlife habitat and range management research emphasizes development of methods and practices for building up or maintaining forage production on forest and related non-forest ranges, and for its efficient utilization by game and livestock, at maximum levels consistent with other values of land for watershed, recreation, timber production, or other uses. Emphasis is being placed on determination of proper intensities of stocking, systems of grazing, and seasons of use for native ranges, seeded ranges, and ranges on which undesirable plants have been controlled. Methods are being developed for coordinating livestock and big game use of the same ranges. Studies are also under way on the use of fire in the control of undesirable range plants, and the development of methods for restoring and managing desirable forage plants on game ranges.

Watershed management research is directed toward improving soil and cover conditions and practices to alleviate flood and sediment problems arising out of past land use, and toward helping meet urban, rural, and industrial demands for water of good supply and high quality. Watershed use problems are attacked by obtaining quantitative measurements of the effects of such activities as fire, logging, grazing, and road construction on water supply and quality. Concurrent with these studies are those to determine how to use watersheds for various economic purposes and still provide satisfactory water supplies. Possibilities of increasing water yield through manipulation of the vegetation are being studied. Particular attention is being given to the effects of watershed use and management on study areas as they are reflected in soil-plant-water relations. This provides both an understanding of the cause and effects of given measures and a means of predicting the magnitude of results from applying watershed use and management measures on other areas.

Recreation research emphasizes development of methods for rehabilitating deteriorated recreation areas and determination of carrying capacities for all types of recreational resources; develops adequate methods for measuring recreation use and projections of future demands; studies how to coordinate recreation with timber, grazing, and watershed management and evaluates, the effects of alternate methods of multiple use management on recreation.

Selected Examples of Recent Progress

Forest Management Research

Pruning hardwoods. Pruning of hardwoods to improve their future value is complicated by the great variety of commercial species in the United States and by the risk of inducing further branching and decay. Pruning studies now are under way on several of the commercially important hardwood species. An 18-year study in Wisconsin indicates that live branch pruning of young northern hardwoods results in rapid healing of wounds under 2 inches in diameter. On all properly pruned trees, wounds healed quickly, knots were tight and free of heart rot, and additional branching was not serious on dominant and codominant trees. Flush pruning of black cherry, a valuable cabinet wood, lead to results in Pennsylvania similar to those found in Wisconsin. This latter study, which has been in progress since 1937, shows that pruning of young, vigorous black cherry is a promising method for producing high-quality trees.

Stand density controls timber growth and quality. A major objective of forest research is to determine the relationship of timber growth and quality to stand density, site, and age for the improtant forest types of the United States. Volume growth per acre of young loblolly pine stands in the South increased with increasing stand density on good sites, but dropped off at the higher densities on poor sites.

Thus, the optimum density for growth in young stands was closer to full stocking on good sites, but closer to half of full stocking on poorer sites. In older stands volume growth increased with increasing density on all sites, but the increase was less on poor sites than on good sites. On relatively poor sites in Western Montana maximum growth per acre of thinned stands in ponderosa pine occurred at 45 to 70 percent of full stocking. In stands more heavily stocked, both height growth and volume growth were increased by thinning. Heavy thinnings in young northern hardwood stands resulted in about a 50 percent increase in the number of crop trees forked within 25 feet of the ground, thus reducing tree quality. However, the thinned stands produced 1,370 board feet per acre at age 30 as compared to 850 board feet in the unthinned stands. In the deep South thinning of water oak lead to sprouting of the remaining trees but it was not serious on trees in the upper crown classes, even after heavy release.

Planting coal-stripped lands. Ten years of planting research have shown how to successfully establish young forests on the spoil banks left by coal stripping in Ohio. A comparative rating for a number of tree species planted on the banks has been worked out and conditions identified under which each species should be planted. Plantations established on the banks are beginning to yield small products such as posts, poles, and Christmas trees. This work is now essentially complete and a publication describing the methods recommended is being prepared.

Deer and timber conflict. Forestry practices have done much to provide suitable food and cover for deer. However, research completed in New Jersey and New York has demonstrated that forestry and maximum numbers of deer are incompatible. This work also showed that deer populations in certain localities are sufficiently large to reduce future timber and browse values. In the Pine Region of New Jersey deer are overusing Atlantic white cedar, which is a palatable browse and a valuable timber species. Because of overbrowsing, cedar is being replaced by the less palatable pines, hardwoods, and shrubs. Reproduction cutting studies in the northern hardwoods of New York have shown that the shelterwood system gave excellent reproduction of the most desirable species--sugar maple, yellow birch and white ash. However, deer preferred to browse these same species and prevented the reproduction from growing into larger trees. The solution to the problem of over-browsing is to keep deer populations in balance with natural food supplies and to increase the supply when possible through forestry practices.

Woodland management pays. Annual cuts on two woodlands, of 47 and 55 acres, in Maine indicate the profits that owners might receive during the first few years of managing small woodlands. Most of the material harvested was pulpwood, although some saw logs and a

few cedar posts were cut. The gross income less the cost of operating chain saws and tractors amounted to $4.50 per acre per year on the 47-acre tract and $15.60 per acre per year on the 55-acre tract. This latter tract had the better forest. An owner doing his own logging on similar tracts thus would have realized a comparable income while maintaining his forest in a productive condition.

A small woodland under management in East Texas has shown that improvement in stand composition and stocking--a major need is most small woodlands throughout the United States--can be done with some immediate income to the owner. In this woodland, poor quality hardwoods and pines were removed over a 10-year-period, culls were deadened to release young pines, and seedlings were planted in openings. Concurrent with improvement of the forest, the woodland yielded a net return of $3.20 per acre per year.

Naval stores production. Raising production efficiency by breeding high-yielding trees is one of several ways research can help the naval stores producer. The selection and breeding of high-yielding trees would be greatly facilitated if the potential oleoresin yield of young trees could be indirectly estimated by some simple measurement. Techniques have now been developed for determining the exudation pressure and viscosity of oleoresin as possible indicators of yield. Oleoresin pressure of different trees was found to be related to yield and is under fairly strong genetic control. The pressure-viscosity ratio is likewise under genetic control and is significantly related to gum yield. Thus, the pressure-viscosity ratio may be useful in selecting potentially high-yielding trees for breeding.

Breeding trees for pest resistance. The rapid acceleration of forest planting in the United States emphasizes the need for selecting and breeding trees having superior qualities, such as resistance to pests. To meet this need research is underway on the selection and breeding for resistance to diseases and insects in several species. For example, crosses of all four major species of southern pines are being used in efforts to develop insect-and disease-resistant types. A survey of natural and planted white pine in the Northeast has indicated that trees of this species were susceptible throughout the area to the white pine weevil. This finding reduces the possibility of using resistant geographic strains or individuals in developing weevil resistant stock. The alternative, then, is to create hybrids with other species which are resistant to the weevil and which will cross with eastern white pine.

Water control for timber production. A high water table, often held by a shallow, impervious soil layer, may be either beneficial or detrimental to forest trees depending upon the tree species, the time of the year, and the length of time the trees are flooded. The impoundment of shallow ponds of water in hardwood forests of Mississippi

and Arkansas has been done primarily to attract water fowl. However, a recent study shows that if these bodies of water are formed in September or October and drained in April, the trees are benefited by the increased soil moisture and have also been well protected from fire. Continuous flooding throughout one year resulted in the death of cherrybark oak, and after four years of continuous flooding, trees of all species were dead. This research is expected to result in schedules of water impoundment that will aid both waterfowl management and timber production.

Aids to natural regeneration. The results of many years of research on longleaf pine silviculture illustrate the complications that may be involved in bringing a valuable tree crop through in spite of various natural hazards. Assuming that a seed source is still available and that hardwood competition is not excessive, the regeneration of longleaf pine in Louisiana requires the following steps: during the winter before seedfall, eradicate town ant colonies; in the spring, burn to prepare a seedbed and fence out livestock; at time of natural seedfall, in the autumn, follow up on treatment of town ants and direct seed openings in woods; during the second spring, harvest all pine seed trees and deaden the hardwoods; and during the second fall begin watching for brown spot and prescribe-burn to control it if necessary. Fortunately these measures are neither costly or difficult.

Natural regeneration of Shasta red fir. The first large-scale logging of Shasta red fir in Oregon in 1950 pointed up the need for research on silvicultural methods for regenerating the species. Recent research has shown that the staggered-setting pattern of clearcutting with natural reproduction, similar to the method used in Douglas-fir, is a satisfactory silvicultural system for Shasta red fir. However, cutting units should be limited to 15 or 20 acres in size to insure adequate dissemination of seed over all parts of the cutover area.

Natural regeneration of Eastern hardwoods. Natural regeneration is the most feasible way of perpetuating the million acres of eastern hardwoods cut over annually in the United States. Research in several major forest types shows that definite reproduction patterns can be expected to follow different cutting systems. In the northern hardwood forest of New Hampshire selection-cutting leads to natural reproduction of the shade-tolerant species almost exclusively--for example, sugar maple and beech. Patch cuttings of 0.1 to 0.6 acres favor species of intermediate tolerance such as yellow birch and white ash, whereas clear cuttings of 5 acres or more favor the establishment of intolerant paper birch and aspen. When individual trees are removed or light cuts made in the upland oak forests of southeastern Ohio, oaks will make up most of the reproduction. If heavy cuts are made which remove all of the sawtimber or take two-thirds of the total stand, a mixture of oaks and yellow-poplars can be expected. Where stands are clear-cut and a seed source is available, yellow-poplar will be most prevalent in the reproduction.

Other work in this area indicates that the chances of obtaining natural yellow-poplar reproduction are better in open areas than under dense canopies.

Processing research data. Forest research has a continuing need for more efficient and comprehensive techniques and tools with which to solve the more complex problems. A data processing program has been developed by the Southern Station, using electronic computers, that now permits rapid and complete analysis of large volumes of forestry research data. Up to 500 sets of observations, each consisting of a dependent variable and 9 independent variables, can be processed by this analysis program. The machine computes all of the 511 regressions resulting from all possible combinations of the 9 variables. The computer does this automatically in 15 minutes, whereas several man-weeks would be required by the conventional, manually operated machines.

Tree growth is related to soil moisture. Starting in 1952 and extending through 1956, the South experienced a drought which caused tremendous losses in timber growth. In South Arkansas for example, periodic net cubic-foot growth per acre during the drought was only 65 percent of the growth made during the pre-drought period. In northern Mississippi, radial growth in a 19-year old stand of shortleaf pine was found to drop off sharply during periods of rapid soil moisture depletion. Then, after a rain growth increased until the soil dried out again. Under-story hardwoods in upland pine stands compete significantly with the pines for soil moisture. In Arkansas, midsummer soil water losses were about 25 percent faster in upland pine stands when the hardwood under-story was left in place than when it was removed. And in the sandhills of Florida, good growth of planted slash pine depends upon complete removal of all natural vegetation. Denudation of the planting site conserves soil moisture for the planted pines.

Silvicultural use of fire in ponderosa pine. The first plot study on the use of fire as a tool in the management of ponderosa pine in the Southwest shows some benefits and some limitations. Prescribed fire, properly controlled, did reduce fuels without excessive damage to the larger trees. However, fire showed little promise as a thinning agent. Only parts of the area burned were effectively thinned, whereas other parts were completely killed or remained overstocked. This study indicated that the range of intensity within which fire will thin effectively may be too narrow to be attained consistently in this area with the present degree of control over fire. Use of prescribed fire to thin sapling stands of ponderosa pine was also studied in northeastern Washington. In the 6 years after burning, crop trees on the burned plots grew 36 percent more in diameter and 7 percent more in height than those on unburned plots because of reduced competition from other trees. However,

20 percent of the crop trees developed fire scars, and the fire killed all trees in several spots where fuels were concentrated.

Wildlife Habitat and Range Management Research

Investigations on native bluestem range in Louisiana continue to show the value of proper stocking, controlled breeding, early weaning, and supplemental feeding of protein and minerals. The 1958 calf crop from cows receiving improved management was 88 percent and calf weights average 435 pounds at weaning time. By contrast, other range herds in that area on the average produced a 50 percent calf crop and 300-pound calves at weaning time.

Shrub invasion threatens seeded range. Reestablishment of shrubs, particularly big sagebrush, is threatening to reduce the grazing capacity of many seeded ranges. Although this shrub provides considerable forage for big game, especially on winter range concentration areas, it is an undesirable invader on livestock range. In northern New Mexico, sagebrush plants that survived crested wheatgrass seeding operations in 1947 have increased 50 percent or more in crown area under all intensities of spring grazing. Since cattle grazing began in 1952, 280 sagebrush plants per acre have become established on lightly-grazed range, 560 on moderately-grazed range, and 890 on heavily-grazed range. Similarly, results at the Benmore Experimental Range in Utah indicate that big sagebrush and rabbitbrush invasion into crested wheatgrass spring-fall ranges cannot always be prevented by management of cattle grazing. But more brush invaded and persisted on heavily-grazed ranges than on those grazed lightly or moderately.

Use of seeded range avoids larkspur losses. On subalpine range at the Great Basin Research Center in Utah it has been found easier to avoid cattle poisoning on seeded range than native range. Seeded grasses are utilized much heavier than associated native plants, including poisonous larkspur. On native range, where larkspur was utilized 38 percent, cattle death loss was intolerable being about 20 percent. In contrast, on adjacent seeded range, larkspur was utilized only 10 percent and no cattle losses occurred.

Sulphur fertilization increases range production. In California ranges fertilized with sulfur produced 3,139 pounds of dry herbage per acre, 47 percent more than unfertilized range. When utilized to a moderate degree, the fertilized range produced 61 steer days per acre as compared to 30 steer days on the unfertilized. At the same time animal weight gains were increased from 20.4 to 64.2 pounds per acre during the green-forage period.

Thinning loblolly pine increased deer forage. In Louisiana forage production and composition are being measured in a loblolly pine plantation that was thinned to various degrees in 1948 and 1953,

leaving basal areas of 100,85, and 70 square feet of pine per acre. Production of palatable deer browse in 1957, mainly vines, varied directly with thinning intensity. Oven-dry yields ranged from 90 pounds under light thinning to 136 pounds per acre with heavy thinning. The quantity of palatable browse during the winter was only 65 percent of that available during the summer and this quantity determines year-round grazing capacity of game ranges.

Controlling stocking rate reduces damage to planted pines. In south Florida damage to planted pines showed striking differences between intensities of cattle stocking. Sixty days after planting 30 percent of the longleaf and slash pine trees were severely damaged in the heavily-grazed areas; 8 percent, in the moderately-grazed area; and less than 1 percent in the lightly-grazed area. Apparently pine reproduction can be established on these areas if intensity of grazing use is not too high.

Burning low-value shrubs increases forage production. In Arizona burroweed plants on semidesert grass shrub range were reduced 85 percent by a burn in June 1955, and by 1958 were still 70 percent below the pre-burn numbers. Other shrubby species, including cacti and mesquite, were little affected by burning; whereas annual grass production was increased 28 percent. Spring and early summer appear to be the most effective seasons for controlling burroweed. In south Georgia burning in early March 1956 followed by spraying the sprouts with 2 pounds of 2,4,5-T per acre in late August killed 84 percent of the gallberry stems and reduced foliage density about 80 percent. This reduced competition sufficiently to permit a three-fold increase in yield of forage grasses by September 1958.

Grass root systems reflect grazing intensity. Root production of native plants growing on the Manitou Experimental Forest in Colorado was lowered by grazing from June through October and the effect was proportional to the intensity of grazing. The weight of roots and the maximum depth of penetration decreased as grazing intensity increased. For example, roots of the two best forage species--mountain muhly and Arizona fescue--when ungrazed penetrated about 3-1/2 feet and when moderately-grazed about 2-1/2 feet, whereas roots of heavily-grazed plants penetrated less than 2 feet. Forage production is greatest from the plants with the best root development.

Climate-range plant studies point way to better management. Recently completed longtime studies on the relation of native range plants to climatic factors on sagebrush-grass range of the upper Snake River Plains of Idaho show rate of plant development and growth to be controlled chiefly by temperature. Hence the appropriate date for beginning grazing each year can be estimated from March mean temperatures. Total volume of herbage produced and flower stalk production,

however, is influenced mainly by available moisture. Therefore, yield of grasses and forbs can be predicted from the previous July to March precipitation.

Watershed Management Research

Interception of snow in tree crowns accounts for loss of water. Ice cones placed in the top, the center and beneath the crown of a tree are being used to simulate intercepted snow. Measurements of melt and evaporation from these cones reveal 50 percent more heat received by the cone at the top of the tree than under the crown of the tree. The intermediately placed cone received an intermediate heat supply, this being the governing factor in rate of melt and loss by evaporation. Through reduced interception water content of the snowpack under mixed ponderosa pine-Douglas-fir stands on north exposures in Colorado was increased by logging. Snow samples were taken on (1) uncut areas, (2) areas where 60 percent of the merchantable volume had been removed (moderate cut), and (3) areas where all merchantable trees down to 10 inches diameter had been cut (heavy cut). Water content of the snowpack was 4 percent greater under the moderately cut stand and 28 percent greater under the heavily cut stand than the uncut stand. Both intensities of logging increased the snowmelt rate so that the snow disappeared from all areas at very nearly the same time.

Soil moisture depletion reduced by clear cutting. Clear cutting of a hardwood forest in southern Ohio has resulted in a considerable reduction in loss of moisture from the profile of a rather typical thin clay loam soil, having a total moisture storage capacity of about 13 inches of water. In the first growing season after cutting, soil moisture depletion was 6.6 inches in the uncut forest but only 3.4 in the clear-cut, a difference of 3.2 inches. This difference was less, but still significant, 2.3 inches, in the second growing season, indicating that even in shallow soils clear cutting the mixed oak forest can be expected to affect streamflow because less water is needed to recharge the soil profile to allow percolation to groundwater storage and streamflow.

Prevention of serious erosion and runoff from logging roads. A mathematical alignment chart or slide rule, as a guide for locating logging roads and prescribing their design characteristics to prevent serious erosion and damaging runoff is being developed for the Intermountain region. The method used provides the road locator with a quick and accurate check against locating too much of any proposed logging road too near a stream channel or lower logging road. In addition, the method prescribes erosion control treatments considering slope distance between the new road and lower roads and stream channels, so as to prevent sediment originating on roads from traversing even narrow protective strips below the roads. The energy relationships of 22 independent watershed characteristics to sediment movement distance below a road shoulder and to the distance which water can flow down a road before cutting in beyond a depth of one inch were developed

separately for all positions of a conventional road cross-section. Data of this kind have been obtained for each of five soil groups commonly found in the Intermountain region.

Loblolly pine gives control of erosion and runoff. A 20-year-old plantation of loblolly pine in Mississippi has given remarkable control of runoff and erosion as compared with old fields and depleted hardwoods. Three small watersheds of each cover type were measured. The average surface runoff from the pine plantation for a 12-month period was only 2.4 percent of the precipitation as compared with 9.9 percent for the depleted hardwood units and 14.5 percent for the old fields. Average sediment yields per watershed unit for the year were 62 pounds per acre from the loblolly plantations, 627 pounds from depleted hardwoods, and 731 pounds per acre from the old fields.

Mountain watersheds rehabilitated by protection and planting. Three watersheds at the Coweeta Hydrologic Laboratory in North Carolina, subjected in the past for research purposes to poor practices of mountain farming, woodland grazing, and mountain logging, are now nearly rehabilitated through protection and planting. An excellent cover of grass and herbaceous cover was developed on the mountain farm along with white pine and yellow poplar planted in 1954. Flood flow data reveal that flood peak occurrence has dropped to nearly the frequency that obtained prior to initiation of farming on the steep slopes. The previously grazed woodland watershed is now protected and is rehabilitating naturally. Tree reproduction has been slow in areas heavily trampled by livestock and where the overstory tree canopy approaches 100 percent, but sediment losses from this watershed are now negligible. On the logged watershed, constructing frequent water bars, seeding grass, and using mulch and brush on critical bare areas on about 2 miles of severely eroded logging roads has reduced sediment loss by more than 90 percent.

Characteristics of salt cedar. Salt cedar shrubs, abundant in southwestern United States and noted for their high water use, increase their water use rate (transpiration) with increased light intensity and low humidity in the field. The evaporation-transpiration rate, measured on 10-foot circular plots of Bermuda grass and salt cedar, increased uniformly with the amount of salt cedar present. Salt cedar has definite taproots with profuse secondary roots occupying the entire soil profile above the water table. Root cuttings, however, have never produced stem sprouts so that if shrubs are cut below the root crowns in control operations sprouting will not occur. Stem cuttings will produce sprouts but in clearing operations with the Fleco root plow no regrowth of salt cedar was observed except where the operation failed to cut a shrub. Soil characteristics are being studied and show that the salt content of surface soil increases as salt cedar increases in density.

Forest Protection Research (Fire, Insects, Diseases)

Current Activities: This work includes projects concerned with research on the control or prevention of damage by fires, insects, and diseases in forests.

Research on the protection of forest, range, and watershed lands from fire is directed toward reducing losses from fire, better efficiency in application of fire control measures, and toward learning how to use fire beneficially in the management of forests and related range lands. The possibilities of reducing the large number of man-caused fires by improved fire prevention methods are under study. Explorations on reducing the severity of fire-setting lightning storms are being continued. Special attention is also being given to understanding the unexpected behavior of large fires, and to improving methods of attack through the use of airplanes, helicopters, and other devices. Special study is being given to conditions for using fire for hazard reduction, and for control or modification of vegetal cover.

Research on forest insects is directed toward the prevention or control of destructive insect attack on forests and forest products. Damage by insects enters into all phases of forest management from the seed to the mature forest. The development of effective and economical methods of direct and indirect control is dependent upon thorough knowledge of life histories and habits of forest insects, including the interrelationships between the insects and their environments. Investigations on direct control methods involve mechanical and chemical methods. Research on improvement of insect survey methods with particular emphasis on use of aerial photographs is an important phase of the work. Control of forest insects by indirect methods such as the use of natural or introduced predators and diseases of insects, and by silvicultural practices designed to prevent the buildup of insect epidemics, offers promise and is being emphasized in the research program.

Research on diseases in forests, forest tree nurseries, and on decays and stains of forest products provides the basic information on the causes of diseases and on practicable and effective methods of combating them. Studies are underway on the identification and life history of the pathogens that cause disease, on the environmental conditions that result in disease epidemics in forests, on direct control by chemical and mechanical methods, on indirect control through silvicultural practices and genetic resistance, and on the improvement of disease survey techniques. In the products field, research is directed to the determination of methods of handling logs and lumber to prevent fungus infection; of the proper use of naturally durable or treated wood in high-hazard locations; and of improved structural design to reduce decay of wood in service.

Selected Examples of Recent Progress

Forest Fire Research

Forest fire laboratory studies. Application of basic laws of heat transfer and of aerothermodynamics has been used to develop scaling equations for the design of scale model fire tests in laboratory-controlled environments. Other studies are concurrently developing experimental methods and techniques for producing and instrumenting model fires of desired characteristics to lay the groundwork for refined experiments that will yield quantitative results.

Learning more about wind. How to know what the wind is going to do next is one of the firefighter's greatest worries. Foresters and meteorologists have been concentrating on the development of aids to supplement his judgment. One study has recently identified two types of Santa Ana winds that frequently result in disastrous fires in southern California. One type hugs the ground and flows uphill and down near the surface. The other hits the peaks and ridges without getting into the deeper canyons. Conflagrations may result from either but burn quite differently. Intensive studies are going ahead to search out the causes of these wind differences and from them develop new guides for planning fire suppression strategy. This and other similar studies are giving increasing emphasis to the important role of the air aloft as an important part of fireweather.

Lightning fire studies. Controlled seeding of thunderstorm clouds with silver iodide from ground-based generators continued last year in both Montana and California. Previous tests had shown the possibility of interrupting the growth of young cumulus clouds by this technique. Ground seeding tests in Montana last year, however, did not significantly affect the numbers of lightning strikes, while in California there were more strikes and more fires on days when ground seeding was done than on those with no seeding. Both series of tests indicated that ground seeding cannot be relied upon to yield sufficient silver iodide at cloud-base levels to arrest thunderstorm development. A few tests of seeding large storms with airborne generators near the cloud bases appeared to give much more favorable results. The possibilities of this technique will be explored further.

Another new fire retardant. The development of operational systems for dropping bulk loads of liquids onto forest fires from airplanes in 1956 stimulated the search for chemical additives to water to enhance its fire fighting properties. Sodium-calcium-borate was found to be effective for this purpose and came into rapid widespread use. It had disadvantages, though, because it is abrasive and therefore hard on pumping equipment, it is somewhat toxic to forest vegetation and is costly both to procure and transport. Last year "swelling-type" bentonite clay, used widely in oil well drilling, was found to be about equally effective. It is non-toxic, its delivered cost is

only about 1/10 that of borate, and it is far less abrasive. Present indications are that until continuing search discloses something better bentonite will largely replace borate for air drops on forest fires.

Fire Research leads to better fire strategy. Optimum performance in most fire control jobs requires specialized training in fields peculiar to this activity alone. Fire research contributes new knowledge and new methods for which it develops and helps carry out new teaching programs. Last year it produced two sound and color motion picture training films. It designed and equipped a pilot plant regional "Training Aids Center" to assist supervisory fire personnel in developing on-ground training programs. Instruction by research staff specialists in more than 25 weather and fire behavior subjects was given at recently inaugurated national fire training schools. This is expected to raise the performance levels in fire fighting strategy and contribute much toward fire fighting safety.

Controlled burning in ponderosa pine is questionable. Intentional controlled burning of ponderosa pine in the West is frequently advocated to reduce fire hazard and at the same time thin overstocked stands. Analysis of the result of controlled burning 30,000 acres of Apache Indian Reservation in Arizona indicates that such a combined objective may be difficult to achieve. Study of the data indicates that in uncut stands fire intensity is inversely proportional to stand density. Thinning effect and fuel reduction are, on the other hand, directly proportional to fire intensity. Hence, fire of the kind used here was a poor tool for thinning and fuel reduction in uncut stands. Results are similar but somewhat more erratic on recently logged areas.

Forest Insect Research

Parasites and diseases control outbreak of the black-headed budworm. Outbreaks of the black-headed budworm in western Washington were brought under control by its native parasitic enemies and by disease. A similar outbreak in eastern Oregon was brought under control by parasites alone.

Predators of the balsam woolly aphid. Insect predators of the balsam woolly aphid were introduced from abroad and liberated in aphid-infested stands of fir in the Pacific Northwest. Five species of predators were introduced from Europe, two of which appear to have been established successfully. Two other species, which it is believed will feed on the aphid, were introduced from Japan. So far, it has not been determined whether the latter ones have become established in this country or not.

Systemic insecticide offers promise in control of bark beetle vector of Dutch elm disease fungus. The chemical, amitron paratoluene sulfonate, known as Chipman 6200,was found to be fairly effective in reducing or preventing attack on elms by the smaller Europeran elm bark beetle, the

principal vector of Dutch elm disease in the United States. This chemical was applied to trees by trunk implantation and was translocated to different parts of the tree through the sapstream.

Better insecticidal control of bark beetles a possibility. Laboratory studies indicate that the volume of insecticidal sprays applied to the bark surface of trees is important in determining their effectiveness. The toxicity of some insecticides varies directly with the dosage, whereas the toxicity of others is greater at intermediate than at heavy dosages.

Parasites aid in control of the European pine shoot moth in the Lake States. Prospects for more effective control of the European pine shoot moth in the Lake States by parasites have been brightened. A species of foreign parasite which was released against the moth in nearby sections of Canada during recent years has been discovered in several parts of Michigan. This parasite is one of the more important enemies of the shoot moth in its native habitat in Europe and it may prove of great value in the future control of infestations in the Lake States.

Percent survival of bark beetle broods in newly-attacked trees indicative of infestations trends. Recent studies of Black Hills beetle infestations in the Rocky Mountains indicate that percentage survival of beetle broods in newly-attacked trees is much higher in increasing infestations than in static or declining ones. The same sort of thing has also been found for Engelmann spruce beetle infestations in Colorado. Knowledge such as this is of great value in determining the trends of infestations and in deciding for or against their control.

Insect predators apparently reduce populations of Black Hills beetle in Utah. In parts of Utah, populations of the Black Hills beetle in ponderosa pine have been declining recently. In studies to determine the cause of this it was found that 3 species of predaceous beetles were abundant in the lower sections of the boles of infested trees. Here, the number of emerging Black Hills beetles was less than the number that attacked in the first place. It is believed that the predators were largely responsible for this reduction in the population.

Control of bark beetles attacking ponderosa pines in California. Analysis of results obtained in a 16-year methods-of-cutting study in stands of ponderosa pine in California has shown that the removal from stands of trees considered highly susceptible to attack by bark beetles will result in a sharp reduction in tree mortality thereafter. On the basis of this, it is considered likely that by removing all of the susceptible trees, mortality resulting from insect attacks will probably not return to pre-cutting levels for long periods of time.

Control of the Nantucket pine moth. Studies in Texas indicate that damage to loblolly pines by the Nantucket pine moth can be reduced significantly by the airplane application during March of a spray containing either DDT or chlordane.

Some vapor barrier-type materials appear to be resistant to termites. Several vapor barrier-type materials have been studied to determine their possible resistance to penetration by termites. Of these, both a polyethylene film 6 mils thick and a vinyl film either 3 mils or 6-10 mils thick have resisted penetration in tests for as much as three years.

Forest Disease Research

Survival and growth of the oak wilt fungus in wood is being studied as the first step toward formulating treatments that will eliminate the organism from oak export products and thereby reopen markets now closed by foreign quarantine regulations. Indications are that the fungus can invade all portions of black and white oak sapwood and, to a lesser degree, heartwood. Wood moisture appears to be the primary factor limiting the survival of the fungus.

Specifications for control of dwarfmistletoe on ponderosa pine through pruning have been developed. If infections on branches 1 inch or less in diameter are not closer than 6 inches to the trunk they can be removed with certainty by pruning. For each 1 inch increase in branch diameter, the minimum safe distance must be increased by 2 inches.

Biological control of dwarfmistletoe shows increased promise through discovery of two fungus enemies of this parasite. The "resin disease" was found on about 85 percent of the dwarfmistletoe plants on lodgepole pine in one area in the Rocky Mountains. Shoots are definitely killed but the effect on the "roots" of the dwarfmistletoe has not yet been determined. The pathogenicity of another fungus on dwarfmistletoe in California has also been established.

Inoculations of quaking aspen with Cenangium singulare caused typical cankers, proving the pathogenicity of the fungus. It infects mainly through fresh wounds and kills rapidly. This disease poses a serious threat to aspen management in the Rocky Mountain area, especially where partial cutting results in even minor wounds on the residual trees.

Shortleaf pine in the littleleaf belt must be managed on a short rotation if excessive losses are to be avoided. Sixteen years ago 9 healthy, 9 early littleleaf, and 9 advanced littleleaf plots were established in fully stocked shortleaf pine stands in the Piedmont. By 1958 the original healthy plots had 25 percent of their trees dead of littleleaf, the early stage plots 29 percent dead, and the severe plots 62 percent dead.

Control of southern cone rust with fermate sprays looks promising in preliminary trials while other chemicals tried gave no control or were damaging to the young cones. Fermate was also found to stimulate pollen germination. The stage of flower or strobili development at time of spraying must be considered in control of this rust. Spraying

only when weather conditions are conclusive to spore dissemination and infection is cheaper and just as effective as spraying at regular 5-day intervals.

Cull indicators for Colorado Engelmann spruce have been worked out. They provide reliable estimates for over 85 percent of the total rot volume. The most useful external indicators of internal decay were punk knots or sporophores of Fomes pini, broken tops, frost cracks, dead rust brooms, and basal wounds.

Decay following wounding of western hemlock young growth in thinning operations during the past 10 years was similar to that previously reported for old-growth hemlock in the Northwest. Sixty percent of the wounds were infected, with positive correlation between wound size and age and extent of decay. Wound-induced decay is much less damaging in young-growth Douglas-fir.

Beetle-killed Engelmann spruce in Colorado deteriorates faster than anticipated as indicated by analyses of decay and windthrow data secured since 1951. About one-third of the original gross volume is lost after 15 years from the time of peak beetle attack, equally divided between decay in standing trees and windthrow.

Decay in beetle-killed Coast Range Douglas-fir amounted to 37 percent of the cubic volume 7 years after the 1951 kill. Small trees are now completely unmerchantable but large ones still contain some salvable material, especially in the lower trunk.

Soil-burial test is superior to the soil-block test in conducting comparative durability studies of soil cover materials used to reduce the decay hazard under basementless houses. Information derived from such tests served as background for a proposed revision of the standard procedure for evaluating soil covers.

Soft rot fungi being identified. About 70 fungi, formerly classed as causing only mold or stain, were isolated from wood with soft rot and shown to be capable of destroying or markedly weakening wood. The soft rot fungi generally can withstand high temperatures, high moisture contents, alkaline reactions, and high dosages of preservative chemicals better than typical decay fungi. Thus they can cause a major loss under these conditions.

Forest Products Utilization Research

Current Activities: The aim of the forest products research program centered at the Forest Products Laboratory and with field projects at the various regional forest and range experiment stations, is to contribute to the solution of national, regional, and local utilization problems of all types; to increase efficiency in harvesting timber crops; to reduce unused woods and mill residues to a minimum by finding uses for present residues; to develop new products; and to improve the serviceability and lower the costs of existing products. Its broad aim, in brief, is to develop new utilization outlets for thinnings, unpopular and little used species of timber, logging and milling residues, and to make the whole timber crop on farms and other forest lands go further and give better service in a wide variety of uses for lumber, paper, chemicals, and other products derived from wood.

Selected Examples of Recent Progress

Forest Products Utilization Research

Chemical Utilization of Plant Residues. Optimum temperature, pressure, acid concentration, and reaction time for producting various chemicals from wood have been determined through laboratory tests. This knowledge has advanced the utilization of wood for the production of furfural, levulinic acid, formic and acetic acid and other chemicals. During the past year the reaction conditions required to convert actual liquid wastes from a large fibre plant were determined. Further investigations have reached the pilot plant stage and design criteria for a commercial plant are being developed.

Newsprint from Northern Hardwoods. As a basis for economic appraisal of possibilities of establishing a newsprint industry using pulp from northern hardwoods, pilot plant tests were made of various combinations of hardwood and softwood pulps. From these experiments and observations of various mixtures used at commercial newsprint mills, it has been concluded that newsprint consisting of 60 percent aspen groundwood, 15 percent cold soda pulp from mixed hardwoods, and 25 percent unbleached softwood sulfite or semibleached softwood sulfate pulp could be made efficiently on modern high-speed paper machines. Properties of papers made experimentally with this combination are reasonably close to the average properties of the commercial newsprint paper produced today. Various other combinations of hardwood and softwood pulps might also be used successfully in the production of newsprint.

Bleached Sulfite Pulp from Southern Hardwoods. Fourteen hardwood species from Louisiana were cooked, both individually and in mixture, by the sulfate process and the pulps were evaluated for quality. The predominating species were oaks (21 percent), cedar elm (19 percent),

water hickory (10 percent), and sweetgum (10 percent). The pulp made from the mixture of species was bleached to a high brightness by a simple three-stage process that comprised prehypochlorite and oxidative extraction techniques for the first two stages and chlorine dioxide for the third stage. The bleached pulp was stronger than seven of eight random samples of commercial bleached coniferous sulfite and hardwood sulfate pulps.

Veneer Flooring in Commercial Production. In 1950 the Forest Products Laboratory and the Housing and Home Finance Agency surveyed the problem of suitable flooring materials for low-cost homes. Two facts stood out: (1) There was a strong desire for wood floors, but (2) concrete floor-slab construction was becoming increasingly popular. There appeared to be a need for an inexpensive, thin wood floor that could be laid directly on the concrete slab.

Veneer seemed to be the answer, but a normally dried veneer sheet bonded to a concrete subfloor would swell and shrink with changes in moisture content, thus pulling loose from the subfloor. The Forest Products Laboratory therefore developed a special technique for drying veneer in a hot press under restraint to prevent normal shrinkage. Several offices were floored with this material bonded directly to concrete and have stood up well under constant use.

Recently several manufacturers have put wood veneer floors into commercial production. These materials, all related to the Laboratory's press-dried veneer flooring, are being marketed in tiles 9 inches square or in random-length strips, either prefinished or unfinished. Special mastic adhesives are used to attach them to a concrete or plywood subfloor.

NWMA Adopts Soil-Block Test. The National Woodwork Manufacturers Association recently adopted the soil-block test as the method the Association would use to determine the toxicity of water-repellent preservative solutions used for millwork. Preservative treatment of millwork is encouraged by the millwork industry of which NWMA is a part. But all preservative solutions must be tested by a uniform method to learn their effectiveness against decay fungi.

The agar block test has been universally used for this purpose and still is standard in some countries. However, when the NWMA's Preservative Standards Advisory Committee met in May, its members agreed that the soil-block test be used instead. This test involves growing the test fungi on wood blocks in contact with the soil. It was improved over several years at the Forest Products Laboratory to a stage that has already led to its adoption as a standard method by the American Society for Testing Materials.

Wood Bin Pallets in Washington's Apple Industry. About 120,000 bin pallets were purchased this past year by apple packers in the State of Washington. These bin pallets cost well over a million dollars and will be used to handle over 4 million bushels of apples, which approaches one-eitht of Washington's total apple crop. It is anticipated that more bins will be purchased next year.

In order to get first hand information, a field survey was conducted on the use of these bin pallets. Design features and construction details were studied so that the information could be passed on to future pallet users as well as fabricators of these containers. Also, observations were made of the harvesting, hauling, packing, and storing operations, and of bin pallet failures, weaknessess, strong points, and costs. Farmers, pickers, plant foremen, forklift operators and bin producers were interviewed. Survey findings and recommendations are given in a report now available to those in the Washington apple industry who will be responsible for purchasing apple bins for next year's harvest.

White-Pocket Douglas-Fir Plywood. To seek more effective utilization of Douglas-fir veneer containing white pocket (Fomes pini), a cooperative program was undertaken with the Douglas Fir Plywood Association. The mechanical properties of Douglas-fir plywood made of grade D veneer and veneer containing white pocket were evaluated through tests of 3/8-inch plywood. Flexure, impact, edgewise shear, rolling shear, and nail-holding properties were investigated. Tests were generally made on large-size specimens so that the effect of localized defects would be dispersed over an area representative of plywood in general use. The results of the investigation indicate that Douglas-fir plywood constructed of veneer containing white pocket, classed as quality X plywood, is comparable in flexural, impact, edgewise shear, rolling shear, and nailing properties to plywood of grade D veneer. The investigation further indicated that Douglas-fir plywood constructed of grade D veneer is comparable to plywood constructed of clear veneer in edgewise shear, rolling shear, flexural stiffness, and latural nail resistance. Flexural strength of grade D plywood is about two-thirds that of clear plywood. Tests were also made on gluing of white-pocket veneers. This work has resulted in the change of commercial standards for Douglas-fir plywood to allow and control use of white-pocket veneer.

Basic Research on Lumber Drying. In an effort to improve the drying of lumber, basic research has been conducted on internal stresses during drying, also on the strength of certain species perpendicular to the grain. Wood develops severe internal stresses while drying because it does not dry evenly throughout its thickness, but develops a moisture gradient with a lower moisture content near the surface than the center. Shrinkage is restrained and the stresses developed are dependent upon drying conditions which are subject to control. The interpretation of this basic research will result in improved drying schedules.

Improvement of Standards for Poles. A study of testing methods, and of strength properties of both treated and untreated wood poles has been completed. This project was sponsored by the American Society for Testing Materials and involved cooperation with pole-using utilities, pole suppliers and preservers, and other agencies concerned with standards for poles. As a result of these tests, data have been

obtained which will permit a national revision of pole standards and specifications. Also the study revealed that the strength properties of certain species could be improved with a revised treating schedule.

Microscopy. The newly installed electron microscope at the Forest Products Laboratoy is being used in a series of investigations that range from an attempt to differentiate between the constituents of the lignin-carbohydrate complex of spruce to problems of adhesion. In the adhesion research, the properties of isolated adhesive films are analyzed as well as the interaction between adhesive and solid substrate. Another investigation being made is on extracellular enzyme action on sweetgum sapwood, in which sound wood is compared with various stages of decay. Improved sectioning techniques are being developed that will lead to greater clarity as the electron microscope is used to examine pit membranes, fibrils and microfibrils, checking, and fibril angles.

Using light microscopes and photomicrographs, examinations were made on pulps made from raw wood. These examinations have been found helpful in determining the degrees of fiber separation by different pulping methods, the amounts and kinds or different wood elements in pulps, and the extents of fibrillation and breakage of fibers after pulp processing.

Making Usable Sawdust. In an effort to make sawdust which is usable for pulping, several new types of saws are being evaluated. Sawdust with a fairly high recovery of usable fiber has been produced; however, the lumber is rougher. Design changes are being made to improve these saws. An economic analysis will be made of the overall net returns from lumber and saw chips.

Forest Resources Research

Current Activities: This work includes the nationwide Forest Survey, research relating to the marketing of timber products, and investigations of the economics of timber production.

Forest Survey. The nationwide forest survey provides basic forest resource facts by States or counties on the character and condition of forest land; the volume, quality, and location of standing timber; rates of timber growth and natural losses; the amount and kind of timber cut for forest products; and national consumption and prospective requirements for timber products. This information provides a basis for policie and action programs of public forestry agencies, forest industries, landowners, and many others having direct interests in forest resources.

Forest Products Marketing. Research in the marketing of forest products includes studies to increase the efficiency of harvesting, grading, selling, and distributing forest products, improved methods for providing price and market information for timber products, and development

of expended markets for timber species and materials in surplus supply, Such marketing investigations are of particular importance to the several million owners of farms and other small forest properties.

Other Economic Research. Investigations of the economic aspects of forestry enterprises provide information on the profitability of producing various timber crops in different areas, the effect of ownership, taxation, and other economic factors on the practice of forestry, and possible means of reducing financial and economic obstacles to the growing and harvesting of forest crops. These studies thus provide economic guidelines for forest owners and timber industries, and in conjunction with other resource investigations furnish part of the facts needed for development of national and local forestry programs.

Selected Examples of Recent Progress

Forest Survey

Additional 53 Million Acres Surveyed. During the year surveys on 53 million acres of forest land were completed to obtain resource information, including 21 million acres surveyed for the first time in Alaska, Colorado, Hawaii, Idaho, Maine, Utah and Wyoming, and 32 million acres resurveyed in Arkansas, California, Florida, Illinois, Missouri, Montana, New Hampshire, Oregon, South Carolina and Washington. About 549 million of the total of 780 million acres of forest land in the United States have now been inventoried and about 350 million acres have been resurveyed to bring resource information up to date.

Softwood Volumes Increasing in Mississippi. As an example of findings in recently surveyed States, the third Forest Survey in Mississippi showed that softwood growth is now 85 percent greater than the cut. On the other hand, hardwood growth equals only 80 percent of the cut. During the eight years between surveys softwood volumes increased 8 percent, while hardwood volumes declined 21 percent. Increases in softwood volumes are attributed to stepped-up management programs, especially on forest industry and public lands. The decline in hardwood volumes is due to land clearing for agriculture, heavy cutting, and drought induced mortality.

Pennsylvania Has 15 Million Acres of Commercial Forest Land. The first comprehensive Forest Survey of Pennsylvania's forest resources showed that 15 million acres of commercial forest land contained 15 billion cubic feet of timber. Sawtimber volumes totaled 23 billion board feet, 90 percent of which is hardwood. Only one-fourth of the forest area supports sawtimber stands, but the total growth is more than three times the volume cut. Pennsylvania's forest can support a much greater cut, especially with increased utilization of low-grade hardwoods.

Survey Techniques Improved. As part of a program of survey techniques research, a classification of forest lands was developed to show existing condition of forest areas, potential productivity, and stand treatment needs. Criteria for such classification include stocking of desirable and poor growing stock trees, area controlled by undesir-

of desirable and poor growing stock trees, area controlled by undesirable vegetation, seed bed conditions, and adequacy of seed source. An improved system of point sampling also was devised for obtaining data required for such area classifications.

Aerial volume tables also have been constructed for several forest types to facilitate interpretation of aerial photographs. In a study conducted in Mississippi a composite table gave reliable estimates of average cubic volume per acre for both southern pines and hardwoods. A related study found that increases in stereoscopic magnifying power had little effect on the accuracy of stnad measurements on aerial photos

Forest Products Marketing Research

Marketing Practices in Kentucky. A study of markets for Kentucky timber indicated use of a variety of buying methods, product specifications and grades, and market outlets for the different forest products produced in the area. Middlemen who have developed a variety of product markets were in the strongest competitive position and more stable than firms having only single product outlets. In another study guides were developed to aid woodland owners in determining whether they should sell timber for saw logs or pulpwood. Studies to improve techniques for collecting and reporting prices of stumpage, saw logs, veneer logs, and other products were continued in cooperation with State agencies in Ohio and South Carolina.

Newsprint Production in the Lake States. A comprehensive study of the technical and economic feasibility of using aspen and other Lake States hardwoods for production of newsprint and other pulp and paper products indicated that production of newsprint in Wisconsin is economically questionable at the present time, whereas expanded production of such products as market kraft pulp and cold-soda pulps made from hardwoods appears to be both technically and economically feasible.

Forest Production Economic Research

Economics of White Pine Blister Rust Control. Field work was completed on a study of the economics of eastern white pine blister rust control in the Lake States region. Guides were developed to indicate areas where special rust control programs can be economically justified. Procedures also were developed for use by foresters and landowners in appraising the profitability of rust control, with and without various management measures, in individual white pine stands.

Forest Ownership. A number of pilot studies to determine the characteristics of owners of small forest properties, factors which influence their production goals, and the effectiveness of various forestry programs were completed in several eastern States. These studies

showed wide variations in essentially all of the attributes of owners of small forest properties, a prevalent lack of interest in forestry, and widespread reluctance to invest in forestry enterprises. Many reasons were given for the general lack of forestry practices and participation in programs, including a basic lack of knowledge of the economic opportunities in forestry. Even in such productive areas as found in Georgia and North Carolina, less than half of the owners of small properties considered timber growing to be the principal use of their forest lands.

STATE AND PRIVATE FORESTRY COOPERATION

Current Activities: This program, for the most part carried on in cooperation with the States, encourages private timber growing through assistance in preventing and suppressing forest fires, reforestation of denuded and poorly stocked areas, and good management of woodlands. Privately owned forest lands comprise three-fourths of the Nation's commercial forest area and produce 90% of all timber cut. The fire control program applies to all forest lands within the boundaries of organized protection units. The balance of the program is concentrated on small forest properties in private ownership because (a) more than half of the commercial forest acreage is in small holdings averaging only about 60 acres each, (b) the small-owner group comprises 99% of private forest owners, and (c) present cutting practices are poorest on these small properties.

Recent Progress and Trends:

Cooperative Forest Fire Control

The 1958 season showed an increased number of fires over 1957; however, the 2,991,842 acres burned was the lowest burned area in any year on record. This record was made in spite of unfavorable fire weather in the western half of the United States and in the Lake States. California reported the driest fall season in 108 years. Only 12 years ago fires burned 23 million acres of forest each year.

Forest land area without organized protection was reduced by 2.4 million acres. Thirty-six million acres, or about 8% of the total of 435 million, now remain unprotected after 47 years of forest fire control program.

The Battelle Memorial Institute of Columbus, Ohio, submitted their report on the cooperative forest fire control problem. They reported fine progress toward the goal of adequate protection of non-Federal forest and watershed lands, but indicated that additional expenditures are needed to bring the program up to the planned standard. The report suggested an adequate sharing of such costs commensurate with national concern with forest resource losses.

Technical services to States are being provided in all phases of forest fire protection, but with special emphasis on equipment development and procurement, fire weather stations and fire weather forecasts, "big-fire" training, and fire prevention methods.

The following table shows State and Federal expenditures for cooperation in forest fire control:

	State and Private Funds Expended, F.Y. 1959	Federal Allotments F.Y. 1960 1/
Alabama	$965,241	$339,100
Arkansas	882,147	273,400
California	12,120,810	1,185,400
Colorado	79,370	32,000
Connecticut	138,391	44,100
Delaware	16,010	15,500
Florida	2,868,700	563,800
Georgia	2,499,722	513,900
Hawaii	14,057	15,000
Idaho	442,641	151,100
Illinois	133,754	44,600
Indiana	135,993	48,200
Iowa	28,431	30,000
Kentucky	432,606	144,200
Louisiana	1,420,010	324,600
Maine	764,094	238,400
Maryland	488,376	109,800
Massachusetts	326,178	113,700
Michigan	1,776,592	413,800
Minnesota	1,859,043	267,700
Mississippi	1,549,262	311,200
Missouri	720,748	205,100
Montana	284,081	102,400
Nebraska	4,047	5,000
Nevada	123,182	31,300
New Hampshire	246,466	71,600
New Jersey	397,195	98,100
New Mexico	69,467	30,000
New York	857,348	226,400
North Carolina	1,174,939	311,600
North Dakota	4,910	5,000
Ohio	253,925	87,900
Oklahoma	166,151	134,200
Oregon	2,455,729	541,600
Pennsylvania	690,242	190,600
Rhode Island	114,468	37,000
South Carolina	1,200,769	299,500
South Dakota	46,065	30,000
Tennessee	915,890	264,400
Texas	735,635	240,500
Utah	114,715	33,700
Vermont	49,202	30,000
Virginia	973,459	256,500
Washington	2,436,859	547,000
West Virginia	571,440	121,400
Wisconsin	1,435,170	319,700
Wyoming	- -	5,000
Administration, Inspection, Prevention, and Special Services to States	- -	680,000
Grand totals	44,983,530	10,085,000

1/ While the amount available to a State may, if the allotment is small, exceed previous expenditures by that State, the actual payment to a State never exceeds State and private funds expended by or under the control of the State.

Cooperative Tree Planting

The program to furnish forest and shelterbelt tree planting stock for planting on privately owned and non-Federal public land authorized by Section 4 of the Clarke-McNary Act continued in fiscal year 1959 to be a major source of tree planting stock. The number of trees shipped to landowners under this program by cooperating State Foresters (in three States, the State College) for each of the last five years in comparison with all forest and shelterbelt trees produced by public and private nurseries is as follows:

Year	States Cooperative Program	All Production National Total
1955	496,571,000	742,273,000
1956	560,456,000	885,968,000
1957	712,272,000	1,101,471,000
1958	764,364,000	1,554,692,000
1959	946,000,000	2,100,000,000 (Est.)

The States of Nevada and New Mexico entered the program beginning in fiscal year 1960. Thus 48 of the 50 States and Puerto Rico are now cooperating in this tree distribution activity.

Cooperative Forest Management and Processing

The following tabulation shows the accomplishments in the Cooperative Forest Management programs for the fiscal year 1959:

Activity	Unit	Accomplishment
Owners given woodland management assistance	Number	76,546
Processors of forest products assisted	Number	7,141
Area receiving management assistance	Acres	4,146,146
Timber products sold or harvested	M.B.F.	659,850
Value of timber products sold or harvested	Dollars	13,253,516
Young timber saved from premature harvest	Acres	293,755
Owners referred to consulting foresters for additional assistance	Number	1,400
Area involved in above referral	Acres	362,773

In fiscal year 1959 the program cost the States $2,391,120. The Federal Government's share in this cooperative program was $1,516,730.

In 1959 there were 509 "service" or "farm foresters" working on the program.

One new State, New Mexico, signed a cooperative forest management agreement with the Forest Service for a program effective July 1, 1959. This makes a total of 46 States and Puerto Rico engaged in this cooperative program.

General Forestry Assistance

The Forest Service continued to give specialized forest management assistance to other Federal and State agencies, and to the Congress, forest industries, consultants and forest schools, by a few specialists working out of Forest Service Regional Offices, and in close coordination with State Foresters.

An informal check showed that over 22 million acres of forest land are now covered by a continuous forest inventory system -- a system promoted by the Forest Service, using machine calculating procedures.

Work in rural development areas continued. In these areas where there is a surplus of timber and labor, new forest industries are being encouraged. For example, in the fall of 1958 the results of a study were published showing the resources and possibility of marketing 30 million board feet of sawtimber and 625,000 cords of available timber in central West Virginia.

(b) Forest Roads and Trails

Appropriation Act, 1960	$26,000,000
Supplemental Appropriation (Supplemental Appropriation Act, 1960)	2,000,000
Base for 1961	28,000,000
Budget Estimate, 1961	30,000,000
Increase	+2,000,000

This appropriation provides for the liquidation of obligations incurred for the construction and maintenance of forest roads and trails pursuant to the authorization contained in the Federal Highway Acts of 1956 and 1958. Roads and trails are essential to protection and management of national forests, and utilization of their resources. An appropriation of $30,000,000 for 1961 will provide sufficient cash to liquidate prior year obligations and obligations planned for fiscal year 1961 which must be paid by June 30, 1961.

Analysis of Cash Requirements by Activities [a/]

	Actual 1959	Estimated 1960	Estimated 1961	Increase or Decrease
Construction of roads and trails	$27,941,335	$22,737,224	$22,850,000	+$112,776
Maintenance of roads and trails	7,537,430	7,488,141	7,150,000	-338,141
Total	35,478,765	30,225,365	30,000,000	-225,365

Authorizations for Appropriations [a/]

Fiscal Year	Construction	Maintenance	Total	Funded	Unfunded
1959	$24,500,000	$7,500,000	$32,000,000	[b/] $23,336,000	$8,664,000
1960	22,500,000	7,500,000	30,000,000	28,000,000	2,000,000
1961	22,500,000	7,500,000	30,000,000	30,000,000	- -
Total	69,500,000	22,500,000	92,000,000	81,336,000	10,664,000

a/ The annual appropriation language and the Department presentation combine the appropriation for "Forest roads and trails" made pursuant to 23 U.S.C. 205 and the appropriation of 10% of forest receipts for construction and maintenance of roads and trails pursuant to 16 U.S.C. 501. This merger of funds is made in order to simplify the programming, allotment, and accounting of funds at the field level. Since the accounts for these two funds are merged it is not practicable to distribute obligations and expenditures between the two appropriations on a precise basis. The amounts shown for the "Forest roads and trails" appropriation are a pro-ration based on the percentage that contract authorization used under the appropriated funds is of total available funds. Expenditure amounts for maintenance are based on all such obligations requiring cash payment during the fiscal year in which obligations are incurred.

b/ The 1959 appropriation of $26,000,000 less prior year unfunded authorization of $2,664,000 provides $23,336,000 for funding of the $32,000,000 authorization for 1959.

Status of Unfunded Authorizations

Unfunded contract authorizations beginning of 1960	$38,664,000
Appropriation, 1960	-28,000,000
Balance unfunded as of June 30, 1960	10,664,000
New contract authorization, 1961	+30,000,000
Total unfunded beginning of 1961	40,664,000
1961 Department Estimate (cash requirements)	-30,000,000
Balance to remain unfunded as of June 30, 1961	10,664,000

Unfunded balance consists of obligations for which cash will not be required in 1961.

Analysis of Cash Requirements

1.	Unliquidated obligations June 30, 1959	$10,400,889
2.	Estimated cash requirements to finance 1960 program a/	+19,824,476
3.	Total cash requirements by June 30, 1960	30,225,365
4.	Less cash on hand, 1960	-30,236,082
5.	Cash balance from 1960 available for use in 1961	-10,717
6.	Obligations in 1960 for which cash was not provided in line 2	10,674,718
7.	Estimated cash required to finance 1961 program b/	+19,335,999
8.	Total cash required for 1961	30,000,000

a/ Based on 65% of new obligations (totaling $30,499,194) requiring cash payments during the fiscal year. This percentage is approximately in line with rate of cash payments in past years.

b/ Based on 65% of $30,000,000 of new obligations, or $19,500,000, but decreased by $164,001 to provide rounded appropriation.

The following tabulation reflects the total program for the construction and maintenance of roads and trails on the national forests by combining the funds available under the appropriation "Forest roads and trails" with the permanent appropriation of 10% of national forest receipts. This permanent appropriation for Roads and trails for States (10% fund) is estimated at $13,640,000 for 1961 compared with $11,860,000 for 1960, or an increase of $1,780,000.

PROJECT STATEMENT

Project	1959	1960 (estimated)	Increase or decrease	1961 (estimated)
1. Construction of roads and trails	$25,228,911	$31,959,194	+$1,180,806	$33,140,000
2. Maintenance of roads and trails	10,072,483	10,400,000	+100,000	10,500,000
Total obligations	35,301,394	42,359,194	+1,280,806	43,640,000
Transfer from "Roads and trails for States"	-8,884,693	-11,860,000	-1,780,000	-13,640,000
Obligations incurred under contract authorization	26,416,701	30,499,194	-499,194	30,000,000
Obligations incurred under unappropriated contract authorization	-416,701	-2,499,194	+2,499,194	- -
Total employee health benefit costs (P.L.86-382)	/- -/	/- -/	/+120,000/	/120,000/
Total appropriation or estimate	26,000,000	28,000,000	+2,000,000(1)	30,000,000

INCREASES

(1) An increase of $2,000,000 is necessary to meet cash requirements for liquidation of obligations resulting from use of contract authorization. This represents additional cash required to pay for:

(a) Obligations of the prior year which will be due for payment in fiscal year 1961, and

(b) The portion of obligations from the contract authorization of $30,000,000 available for fiscal year 1961 which will require cash payment in that year.

The above increase represents additional appropriations required in 1961. The net increase of $1,280,806 in total obligations estimated for 1961 consists of:

(a) A net increase of $1,180,806 for Construction of forest roads and trails, resulting from the following:

1. Portion of anticipated $1,780,000 increase in the transfer from "Roads and trails for States" applied to construction of roads and trails ..... +$1,680,000

2. Decrease in obligations from available contract authorization ..... -499,194

Total ..... +1,180,806

(b) An increase of $100,000 for Maintenance of roads and trails to meet employee health benefit costs under Public Law 86-382, applicable to the base for 1961. The increase is derived from the portion of the $1,780,000 anticipated increase in the transfer from "Roads and trails from States" that was not applied to Construction of roads and trails (see (a) 1, above). A full explanation of the health benefit cost estimates appears under the Increases and Decreases, 1961, for "Forest protection and utilization."

STATUS OF PROGRAM

A forest development transportation system consisting of roads and trails is essential to the protection and management of the national forests and utilization of their resources. Under this program the existing system is maintained and additional roads and trails are constructed in order to obtain the maximum practicable yield and use of the resources of the national forests on a continuing basis. As of June 30, 1959 the system consisted of approximately 152,800 miles of earth or surfaced access roads and 112,200 miles of supplemental foot and horse trails.

The transportation system is maintained in part by the Government and in part by State and local road authorities, private cooperators and permittees, and purchasers of Federal timber. The following table shows how the system was maintained in fiscal year 1959:

	Roads	Trails
	(Miles - Estimated)	
Maintained for traffic or cared for and preserved by the Government	81,400	112,200
Maintained for traffic by others	71,400	- -
Total	152,800	112,200

In fiscal year 1959, $10,072,483 was obligated for maintenance and preservation of the transportation system and $25,228,911 for the construction and reconstruction of access roads and trails. In addition, Federal timber purchasers accomplished reconstruction and construction work on access roads having a value of about $39,650,633.

The construction and reconstruction accomplished on the transportation system in fiscal year 1959 was as follows:

	Units of Work Completed	
	By the Government	By Federal Timber Purchasers
Roads	1,221.0 Mi.	3,506 Mi.
Trails	229.0 Mi.	- -
Bridges	421 Ea.	35 Ea.

(c) Access Roads

Appropriation Act, 1960 and base for 1961	$1,000,000
Budget Estimate, 1961	1,000,000

PROJECT STATEMENT

Project	1959	1960 (estimated)	1961 (estimated)
Access roads (Appropriation or estimate)	- -	$1,000,000	$1,000,000

STATUS OF PROGRAM

Planned use of these funds is to purchase, or to condemn if reasonable purchase negotiations fail, full or partial interest in existing roads or rights-of-way needed for access to national-forest areas so situated that other means of obtaining access are not practical or would not constitute an efficient expenditure of public funds.

In fiscal year 1960 it is planned to acquire roads which would provide access to a substantial area of commercial timber in the Pacific Northwest. Due to rapidly changing conditions, it is not practicable to indicate in advance the specific location of the roads to be acquired but they will be among the highest priority needs of the Forest Service. The capacity of the roads to be acquired, by condemnation if necessary, will be sufficient to serve multiple resource management needs of both public and private lands in the area.

In fiscal year 1961 it is planned to purchase, or condemn if purchase negotiations fail, full or partial interest in rights-of-way or existing roads needed for national forest access in one or more of several locations where road access is a serious problem.

(d) Acquisition of Lands for Superior National Forest

Appropriation Act, 1960 and base for 1961	- -
Budget Estimate, 1961	$1,000,000
Increase	+1,000,000

PROJECT STATEMENT
(On basis of available funds)

Project	1959	1960 (estimated)	Increase	1961 (estimated)
Acquisition of lands for Superior National Forest	$517,052	$14,843	+$985,157	$1,000,000
Unobligated balance brought forward	-531,895	-14,843	+14,843	- -
Unobligated balance carried forward	14,843	- -	- -	- -
Total employee health benefit costs (P.L. 86-382)	[- -]	[- -]	[150]	[150]
Appropriation or estimate	- -	- -	+1,000,000(1)	1,000,000

INCREASE

(1) An increase of $1,000,000 for the land purchase program in the Border Waters Canoe Area, Superior National Forest, Minnesota.

Need for Increase: The Act of June 22, 1948 (62 Stat. 568) as amended by Act of June 22, 1956 (70 Stat. 326), authorizes and directs the Secretary of Agriculture to acquire lands the development or potential development of which impair or threaten to impair the unique values of the remaining wilderness canoe country.

These laws apply to an 860,000-acre area along the United States-Canada boundary in northern Minnesota, in the Superior National Forest. This is a scenic area of lakes, streams and forests unique in the United States and especially suited for outdoor recreation, particularly canoeing, fishing and camping, in a primitive wildland environment.

This program, when completed, will restore the wildland character and esthetic values of the area through purchase of the remaining small acreage of private lands, especially tracts developed for commercial resorts or other habitations.

Appropriations of $2,500,000 were authorized by the Acts of June 22, 1948 and June 22, 1956, of which $1,500,000 has been appropriated to date. The remaining $1,000,000 of the authorization is proposed for appropriation in fiscal year 1961.

Since 1948, 37,270 acres have been acquired within the area through purchase and exchange. This includes 22 developed resort tracts, 34 other improved tracts, and 35,012 acres of unimproved land.

There remain to be acquired 14 resort tracts, 58 other improved tracts, and 28,740 acres of unimproved lands - a total of 31,613 acres. A portion of the unimproved land can be acquired through land exchange but a material acreage will have to be purchased. The 28,740 acres of unimproved land includes 15,700 acres held by counties through tax forfeitures.

A primary objective is to eliminate developments or potential developments, particularly commercial ones, from the area. This is about two-thirds done. Full benefit from the funds invested to date will be realized only if the program is completed.

Property values and prices generally continue upward. Some owners continue to build on their lands, thus increasing the price that ultimately will have to be paid. These trends can be expected to continue. Delay in completion of the program will result in higher total cost.

If the remaining resorts are not acquired promptly, the government will have put these owners in a privileged and highly advantageous position by eliminating many of their competitors, or potential competitors, through the past purchases. The Federal Government will have acquired properties of about one-half of the landowners, most of whom were not anxious to sell, while allowing the other half to keep and enjoy their properties.

Canadians have been critical of continuation of commercial resorts on the American side, taking the position that it adversely affects their efforts to preserve the wilderness character of the boundary waters area, on the Canadian side of the International Boundary.

Plan of Work: It is estimated that the proposed appropriation of $1,000,000 will permit acquiring most of the remaining improved tracts.

CHANGE IN LANGUAGE

The estimates include proposed new language for this item as follows:

Superior National Forest

For the acquisition of forest land within the Superior National Forest, Minnesota, under the provisions of the Act of June 22,1948 (16 U.S.C. 577c-h), as amended, $1,000,000, to remain available until expended: Provided, That no part of this appropriation shall be used for the acquisition of any land without the approval of the local government concerned.

The proposed language would reestablish the appropriation contained in the 1958 Appropriation Act in order to make available the funds authorized to carry out the provisions of the Act of June 22, 1948, as amended.

STATUS OF PROGRAM

This appropriation is for the purchase of land pursuant to the Act of June 22, 1948 (62 Stat. 568), as amended by the Act of June 22, 1956 (70 Stat. 326), to preserve the unique qualities of the remaining wilderness canoe area in the Superior National Forest, Minnesota. The Act of June 22, 1956 extended the area to which the purchase directive applies and authorized additional appropriations.

During the fiscal year 1959 purchases of 15 tracts containing 406 acres and costing $111,475 were negotiated and approved. 1/ These included several improved tracts, the existence of which materially impaired the unique quality of this remaining wilderness canoeing area. Acreage acquired or being acquired in the area to which this law is applicable from June 1948 to date, through purchase and exchange, is 37,270 acres. Emphasis is placed on acquisition of improved tracts and tracts which because of location or character may be improved in the near future, as such tracts most seriously detract from or threaten the distinctive qualities of the canoeing area.

1/ Total obligations of $517,052 in fiscal year 1959 include $390,037 for options negotiated for purchase in fiscal year 1958 but not formally accepted until early in fiscal year 1959.

(e) Acquisition of Lands for Cache National Forest

	Acquisition of Lands for National Forests, Special Acts	Acquisition of Lands for Cache National Forest	Total
Appropriation Act, 1960 and base for 1961	$10,000	$50,000	$60,000
Budget Estimate, 1961 ..	10,000	- -	10,000
Decrease	- -	-50,000	-50,000

PROJECT STATEMENT
(On basis of available funds)

Project	1959	1960 (estimated)	Increase or Decrease	1961 (estimated)
Acquisition of lands for Cache National Forest ...	$25,376	$147,638	-$137,638	$10,000
Unobligated balance brought forward	-53,416	-87,638	+87,638	- -
Unobligated balance carried forward	87,638	- -	- -	- -
Appropriation or estimate ..	59,598	60,000	-50,000 (1)	10,000

DECREASE

(1) The 1960 appropriation of $50,000 for "Acquisition of Lands for Cache National Forest" completed the authorization of $200,000 contained in the Act of July 24, 1956 (70 Stat. 632).

CHANGE IN LANGUAGE

The estimates propose deletion of language for this item as follows:

[Cache National Forest]

[For the acquisition of lands within the boundaries of the Cache National Forest, Utah, under the authority of the Act of July 24, 1956 (70 Stat. 632), $50,000, to remain available until expended.]

This language change deletes the appropriation in its entirety since the authorization of $200,000 has been fully appropriated, and no estimate for this item is proposed in the 1961 Budget.

STATUS OF PROGRAM

Two appropriations have been available for acquisition of lands for Cache National Forest. A $10,000 appropriation is available from national forest receipts when appropriated by Congress. The Act of July 24, 1956 (70 Stat. 632) authorized additional appropriations not exceeding $200,000 for the same purpose. This sum has been appropriated and the authorization completed. Funds appropriated under this Act must be matched by donation of funds or land of not less than equal value contributed by local agencies or persons. These contributions include costs of lands previously donated to the United States by local agencies or groups and national forest receipts used to purchase land which otherwise would have accrued to the benefit of the local counties, to the extent that these exceed contributions by the Federal Government. Such local contributions are nearly sufficient to meet non-Federal cost share required by the Act. Additional contributions are expected.

These funds are used to acquire lands within the Cache National Forest, Utah, which are critical from watershed and erosion standpoints to enable control and minimization of soil erosion and flood damage. These are private lands situated on the slopes of the Wasatch Mountains northeast of Ogden, Utah, where vegetation cover and watershed capabilities have been and are being impaired through over grazing, fire or logging. Water from the mountains supports the cities, towns and agriculture in the valleys. Heavy rains on these mountain areas have in the past resulted in serious floods accompanied by mud-rock flows and excessive erosion of the damaged land. Public ownership of these critical lands is a necessary prerequisite to land restoration and Federal and local governmental agencies are cooperating to this end.

Studies made at the time of the enactment of P.L. 84-781 in 1956 revealed that there were approximately 20,000 acres of such land in the most critical category. In the fiscal years 1956 through 1959 purchases have totalled 6,900 acres, leaving approximately 13,000 acres still to be acquired.

Funds available from both appropriations have been used to acquire key properties, this being the most urgent acquisition need on the Cache National Forest. In 1960 it is planned to acquire the remaining 13,000 acres of these lands.

(f) Cooperative Range Improvements

Appropriation Act, 1960 and base for 1961	$700,000
Budget Estimate, 1961	700,000

STATUS OF PROGRAM

Part of the grazing fees from the national forests, when appropriated, are used to protect or improve the productivity of the range, mainly by construction and maintenance of fences, stock-watering facilities, bridges, corrals, and driveways. These funds are advanced to and merged with the appropriation "Forest protection and utilization," subappropriation "Forest land management."

(g) Assistance to States for Tree Planting

PROJECT STATEMENT

Project	1959	1960 (estimated)	1961 (estimated)
Tree planting	$6,999	$1,776	- -
Unobligated balance brought forward	-8,775	-1,776	- -
Unobligated balance carried forward	1,776	- -	- -
Appropriation or estimate	- -	- -	- -

GENERAL PROVISIONS

CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

Sec. 201. Appropriations available to the Forest Service for the current fiscal year shall be available for: (a) purchase
1 of not to exceed [seventy-five] ninety-eight passenger motor vehicles for replacement only, and hire of such vehicles; operation and maintenance of aircraft and the purchase of not
2 to exceed [three] four of which two shall be for replacement only; * * *

[Sec. 204. The Secretary may sell at market value any property located in Yalobusha, Chickasaw, and Pontotoc Counties, Mississippi, administered under title III of the Act of July 22, 1937,
3 and suitable for return to private ownership under such terms and conditions as would not conflict with the purposes of said Act.]

Sec. [205] 204. Funds appropriated under this Act shall not be
4 used for acquisition of forest lands * * *

Sec. 205. The Secretary may acquire lands within the exterior boundaries of national forests in the States of Missouri, Illinois, Wisconsin, or Minnesota, suitable for administration in connection with the national forests, by exchanging therefor not to exceed an equal value of national-forest land in the
5 State of Iowa pursuant to the provisions of sub-section (a) of section 11 of the Act of August 3, 1956 (7 U.S.C. 428a). Such exchanges may be subject to such outstanding rights, reservations, and conditions as the Secretary may deem appropriate.

The first and second changes in language would provide authority for the Forest Service to replace 98 passenger motor vehicles and to purchase four aircraft of which two will be replacements. A complete justification for this need appears in the justification of estimates for motor vehicles and aircraft.

The third change in language proposes the deletion of Section 204 which authorizes the sale, under certain conditions, of land administered under title III of the Act of July 22, 1937, in Yalobusha, Chickasaw, and Pontotoc Counties in Mississippi. Executive Order 10851 and Proclamation 3326 dated November 27, 1959 transferred all of the title III lands in Mississippi to national forest status. Since it has been determined that these lands are most suitable for retention by the Government (as national forest land), the language authorizing sale of the land to private ownership is no longer necessary.

The fourth change retains former Section 205 without change except for renumbering of the Section (from 205 to 204) due to the elimination of Section 204 of the 1960 Appropriation Act.

The fifth change is to permit the acquisition of lands within the boundaries of national forests in Missouri, Illinois, Wisconsin, and Minnesota by exchanging therefor 4,749 acres of national-forest lands in the State of Iowa.

Section 11 of the Act of August 3, 1956 (7 U.S.C. 428a) authorizes the Department to acquire land by exchange or otherwise as may be necessary to carry out its authorized work if provision therefor is made in applicable appropriations or other law. Other existing authority available to the Forest Service permits exchange of lands only where parcels granted and received by the United States are within an individual State.

There is a need to consolidate national-forest land ownership in the States of Missouri, Illinois, Wisconsin, and Minnesota for more economical administration and more effective resource protection and management. Areas in those States suited for national-forest purposes are available intermingled with existing Government ownerships. In many cases the private owners of intermingled lands are anxious to exchange them for other lands better suited to their needs.

There are only 4,749 acres of national-forest lands in Iowa. These lands are not well consolidated, the total area of Government ownership is so small, and the ownership pattern so scattered that it is not possible to carry on an effective program of resource protection and development except at an excessive cost. There is little privately owned land adjacent to the Government ownership that is primarily suited to national-forest purposes and available for acquisition. In view of these circumstances, the Forest Service considers that it is in the public interest to exchange the national-forest lands in Iowa for lands within national forests in adjacent States which are suited to and needed for natioanl-forest purposes. The effect of such an exchange program will be to better consolidate the national forests and at the same time permit the consolidation of privately owned lands for more economic farm units and needed commercial, residential, and urban development.

(h) Roads and Trails for States, National Forests Fund

Appropriation Act, 1960 and base for 1961	$11,860,000
Budget Estimate, 1961	13,640,000
Increase (due to an estimated increase in national forest receipts in fiscal year 1960)	+1,780,000

The permanent appropriation of 10% of national forest receipts pursuant to the Act of March 4, 1913 (16 U.S.C. 501) is transferred to and merged with the annual appropriation for "Forest Roads and Trails."

(i) Expenses, Brush Disposal

Appropriation Act, 1960 and base for 1961	$6,500,000
Budget Estimate, 1961	6,500,000

PROJECT STATEMENT

Project	1959	1960 (estimated)	1961 (estimated)
1. Brush disposal	$4,670,575	$5,500,000	$6,000,000
2. Brush disposal--fighting forest fires	a/ 1,622,964	- -	- -
Total employee health benefit costs (P.L. 86-382)	[- -]	[- -]	[12,500]
Total available or estimate	6,293,539	5,500,000	6,000,000
Repayment from "Forest protection and utilization, Fighting forest fires" for obligations incurred in prior year	-550,369	-1,622,964	- -
Unobligated balance brought forward	-1,775,362	-1,827,786	-4,450,750
Unobligated balance carried forward	1,827,786	4,450,750	4,950,750
Total appropriation or estimate	5,795,594	6,500,000	6,500,000

a/ Reflects obligations in 1959 for fighting forest fires which were repaid from the fiscal year 1960 appropriation for Fighting Forest Fires.

STATUS OF PROGRAM

Timber cutting and removal creates slash and debris, or brush, which may in turn materially increase the fire hazard. Prior to the sale of national forest timber, consideration is given to treatment of these fuel accumulations to avoid creating large continuous areas of hazardous fuels. Because of this, national forest timber sale contracts require treatment of the debris resulting from cutting operations to the degree necessary to reduce the fire hazard to a point near normal. Depending on circumstances, the work is performed either by the timber purchaser or by the Government. The Brush Disposal appropriation represents deposits by the timber purchaser to cover costs of the work when it is performed by the Government as authorized under Section 6 of the Act of April 24, 1950 (16 U.S.C. 490).

There is a wide variation among Regions in the effect of timber cutting on fire hazard, and consequently in the manner of treating. In the three eastern Regions, the volume cut per acre is relatively low, utilization is close, and the general humid atmospheric conditions result in rapid decomposition of debris. Very little special slash disposal work is done on sale areas in these three Regions, the exception being in some of the sales in the pine type where a heavier cut per acre is often made, such as the jack pine stands of Minnesota. In contrast to the light slash disposal requirements in the eastern Regions, the cost of slash abatement on most sale areas of the western Regions is high. Treatment of the slash is essential if serious and catastrophic fires are to be prevented. The type of treatment varies considerably due to different methods of cutting. For instance, clear cut areas in the Douglas-fir region are broadcast burned. In selectively cut areas the debris may be piled for burning and this may be done over the whole area or only in strips which break the area up into blocks.

In the western Regions purchasers are required to perform slash disposal on some sales or to perform certain phases of the work which they can do more efficiently with their crews and equipment while actively engaged in other phases of the operation. While slash disposal follows general prescriptions within regions, the individual needs of each sale offering are planned and appraised prior to advertisement and appropriate specific requirements are incorporated into each timber sale contract. In each instance the least expensive method or combination of methods is used which will attain adequate protection of the area. In some instances adequate protection from fire is attained at less cost by providing additional protection for sale areas until the slash hazard reverts to near normal. Greater intensity of fire protection for several years may be less costly than complete slash disposal immediately after cutting. In such cases Brush Disposal funds are used in providing the needed manpower and facilities.

(j) Forest Fire Prevention

Appropriation Act, 1960 and base for 1961	$20,000
Budget Estimate, 1961	20,000

PROJECT STATEMENT

Project	1959	1960 (estimated)	1961 (estimated)
Forest fire prevention	$25,736	$20,646	$20,000
Total employee health benefit costs (P.L. 86-382)	[- -]	[- -]	[170]
Unobligated balance brought forward	-10,929	-646	- -
Unobligated balance carried forward	646	- -	- -
Total appropriation or estimate	15,453	20,000	20,000

STATUS OF PROGRAM

Current Activities: The Smokey Bear licensing program is an important part of the Cooperative Forest Fire Prevention Campaign which has been in effect for nineteen years. The Campaign itself has been conducted each year since 1942 as a cooperative project of the State Foresters and the Forest Service, United States Department of Agriculture, and is a public service program of the Advertising Council. The purpose of this campaign is to utilize the free public service resources of the various national advertising channels such as car cards, poster display systems, radio and television networks and magazine and newspaper allocation plans in developing public cooperation in the prevention of man-caused forest fires. Since 1945, this campaign has been built around Smokey Bear, who has become recognized and accepted by the public as a nationwide symbol of forest fire prevention.

Under authorization of Public Law 359 of the 82nd Congress, the Secretary of Agriculture has issued rules and regulations governing the licensing program. These licenses specify payment of royalties (usually 5%) and set up certain controls for administering the program and collecting the royalties including advance deposits to protect the Government's interest. Such collections, along with appropriated funds are used to finance the Cooperative Forest Fire Prevention Campaign. The best items not only from a standpoint of collecting royalties but also in carrying the forest fire prevention message to the public were Smokey Bear comic books, Smokey Bear stamp books, Smokey Bear scarves, and Smokey Bear cookies.

Selected Examples of Recent Progress:

1. The Smokey Bear campaign was so successful last year that on May 8, 1959, Smokey won the top public relations award for 1958-agriculture category. The American Public Relations Association presented the Cooperative Forest Fire Prevention Campaign with the coveted Silver Anvil trophy at their international convention.

2. The first American forest conservation postage stamp was released on October 27, 1958. It was cancelled with a Smokey Bear die. Smokey also appeared on most first day covers of the stamp.

3. A southern Cooperative Forest Fire Prevention Campaign program was launched in November 1958, with Liller, Neal, Battle & Lindsey, the advertising agency in charge of the campaign. All but two southern states are participating with the Forest Service and the Advertising Council in this program.

4. Smokey made his first live network television appearance on CBS-TV's "Captain Kangaroo" program, June 3, 1959. During a fifteen minute program segment on the Forest Service, Smokey presented the Captain with a certificate making him Assistant Chief of the Junior Forest Rangers. As a result of this program, Smokey received 100,000 fan letters.

(k) Restoration of Forest Lands and Improvements

Appropriation Act, 1960 and base for 1961	$100,000
Budget Estimate, 1961	100,000

PROJECT STATEMENT

Project	1959	1960 (estimated)	1961 (estimated)
Restoration of forest lands and improvements	$5,559	$107,083	$100,000
Unobligated balance brought forward	- -	-7,083	- -
Unobligated balance carried forward	7,083	- -	- -
Appropriation or estimate	12,642	100,000	100,000

STATUS OF PROGRAM

Recoveries from cash bonds or forfeitures under surety bonds by permittees or timber purchasers, who fail to complete performance, are used to complete improvement, protection, or rehabilitation work on lands under Forest Service administration. Funds received as settlement of a claim are used for improvement, protection, or rehabilitation made necessary by the action which led to the cash settlement (72 Stat. 217-218).

(1) Payment to Minnesota (Cook, Lake, and St. Louis Counties) from the National Forests Fund

Appropriation Act, 1960 and base for 1961	$121,309
Budget Estimate, 1961	121,309

PROJECT STATEMENT

Project	1959	1960 (estimated)	1961 (estimated)
Payment to Minnesota (appropriation or estimate)	$48,240	$121,309	$121,309

STATUS OF PROGRAM

The Act of June 22, 1948, as amended, (16 U.S.C. 577c-577h) provides that the Secretary of the Treasury, upon certification of the Secretary of Agriculture, shall pay to the State of Minnesota at the close of each fiscal year an amount equivalent to three-fourths of one percent of the fair appraised value of certain national forest lands in the counties of Cook, Lake, and St. Louis situated within the Superior National Forest. The Act further provides that payment to the State shall be distributed to each of these counties in conformity with the fair appraised value of such national forest lands in each county.

(m) Payments Due Counties, Submarginal Land Program, Farm Tenant Act (Permanent Appropriation)

Appropriation Act, 1960 and base for 1961	$500,000
Budget Estimate, 1961	500,000

PROJECT STATEMENT

Project	1959	1960 (estimated)	1961 (estimated)
Payments due counties (appropriation or estimate)	$460,109	$500,000	$500,000

STATUS OF PROGRAM

At the end of each calendar year, 25% of the revenues from the use of submarginal lands are paid to counties under the provisions of Title III of the Bankhead-Jones Farm Tenant Act, approved July 22, 1937 (7 U.S.C. 1012).

(n) Payments to School Funds, Arizona and New Mexico, Act of June 20, 1910

Appropriation Act, 1960 and base for 1961	$113,861
Budget Estimate, 1961	113,861

PROJECT STATEMENT

Project	1959	1960 (estimated)	1961 (estimated)
Payments to school funds (appropriation or estimate)	$117,161	$113,861	$113,861

STATUS OF PROGRAM

Under provisions of the Act of June 20, 1910 (36 Stat. 562,573) certain areas within national forests were granted to the States for school purposes. The percentage that these lands are of the total national forest area within the State is used in determining payments to the States. The receipts from all national forest land within the State are used as the basis for applying the percentage. For example, if total receipts for the State are $100,000 and if 10% of lands are in the "granted for school purposes" category, the payment to the State would be $10,000. The amounts so paid are deducted from the net receipts before computing the 25% payments to States.

As soon after the close of the fiscal year as the receipts from national forests and the area of school lands in the States of Arizona and New Mexico are determined, the payments are made to the States. Estimated payments in fiscal year 1960 to Arizona will be $113,241 and to New Mexico $620.

(o) Payments to States and Territories from the National Forests Fund

Appropriation Act, 1960 and base for 1961	$29,668,588
Budget Estimate, 1961	34,105,000
Increase (due to an estimated increase in the national forest receipts for the fiscal year 1960)	+4,436,412

PROJECT STATEMENT

Project	1959	1960 (estimated)	Increase	1961 (estimated)
Payments to States and Territories (appropriation or estimate) ...	$22,204,787	$29,668,588	+$4,436,412 (1)	$34,105,000

INCREASE

(1) The increase of $4,436,412 in this item for payments to States and Territories in the fiscal year 1961 results from an estimated increase in national forest receipts for the fiscal year 1960.

STATUS OF PROGRAM

The Act of May 23, 1908, as amended (16 U.S.C. 500) requires, with a few exceptions, that 25% of all money received from the national forests during any fiscal year be paid to the States and Territories in which the forests are located, for the benefit of public schools and public roads of the county or counties in which such national forests are situated. The amount of this appropriation varies each year in direct proportion to national forest receipts during the previous fiscal year.

The amounts set aside from receipts collected for the sale of national forest timber, grazing and special use permits, etc., before the 25% is applied are listed below:

1. Payment to the State of Minnesota covering certain national forest lands in the Counties of Cook, Lake, and St. Louis situated within the Superior National Forest, is made under the terms of the Act of June 22, 1948, Public Law 733. Receipts collected from the areas covered by this Act are excluded when the 25% payment to the State of Minnesota is computed.

2. For lands in certain counties in Utah, Nevada, and California, the States receive 25% of receipts only after funds, if made available by Congress, have been set aside for the acquisition of national forest lands within the specified national forests under the terms of special acts authorizing appropriations from forest receipts for this purpose.

3. Payments to the States of Arizona and New Mexico under the provisions of the Act of June 20, 1910, of shares of the gross receipts from the national forests in those States which are proportionate to the areas of land granted to the States for school purposes within the national forests.

(p) Construction of Improvements, Salt Lake City, Utah

Appropriation Act, 1960 and base for 1961	$25,000
Budget Estimate, 1961	- -
Decrease (due to non-recurring nature of project)	-25,000

PROJECT STATEMENT

Project	1959	1960 (estimated)	Decrease	1961 (estimated)
Construction of improvements, Salt Lake City, Utah (appropriation or estimate)	- -	$25,000	-$25,000 (1)	- -

DECREASE

(1) The decrease results from contemplated completion during fiscal year 1960 of the sale of a Forest Service fire warehouse lot together with improvements thereon, to Salt Lake City, Utah. Receipts from the sale, along with appropriated funds, will be used in construction of similar facilities (72 Stat. 589). Present outlook is that award of contracts for such construction may be made prior to July 1, 1960.

STATUS OF PROGRAM

Funds from the sale of a Forest Service fire warehouse lot together with improvements thereon, to Salt Lake City, Utah, will be used in the construction of other similar facilities (72 Stat. 589).

(q) Working Capital Fund, Forest Service

This fund finances on a reimbursable basis various services such as repairing and replacing equipment, stocking and issuing supplies, and operation of photographic and reproduction facilities in support of programs of the Forest Service (16 U.S.C. 579b). These service operations serve programs of fire protection, timber utilization, construction and maintenance of roads and other improvements, reforestation, grazing, watershed, forest and forest products research, and kindred conservation activities of the Forest Service, including cooperative assistance with other Federal agencies, States, counties, and individuals engaged in the same objectives. Government investment in the fund as of June 30, 1959, including donated assets at its inception and retained earnings for fiscal year 1959, is $17,133,901. By the end of 1961 the investment is anticipated to be $20,164,858, an increase of $3,030,957, which represents estimated earnings and donations during 1960 and 1961. Earnings are retained to furnish adequate working capital.

(r) Cooperative Work, Forest Service (Trust Fund)

Contributions are received from cooperators, including counties, States, timber sale operators, individuals, and associations, and are expended by the Forest Service in accordance with the terms of the applicable cooperative agreements. The work consists of protection and improvement of the national forests, work performed for national forest users, and forest investigations and protection, reforestation, and administration of private forest lands.

The major programs conducted under the account "Cooperative Work, Forest Service" are described below in terms of the projects reflected in the statement at the end of this section.

1. Construction and Maintenance of Roads and Trails, and

2. Construction and Maintenance of Other Improvements:

   Under the Acts of June 30, 1914 (16 U.S.C. 498) and March 3, 1925 and April 24, 1950 (16 U.S.C. 572) deposits for cooperative work are accepted from State and local government agencies, associations, Federal timber purchasers, and others for the construction and maintenance of roads, trails, and other improvements and for performing work which is the national forest users' responsibility, this method of performance of the work being of mutual benefit or of benefit to the public at large.

3. Protection of National Forests and Adjacent Private Lands:

   The Act of June 30, 1914 (16 U.S.C. 498) authorizes the acceptance of deposits for the protection of the national forests and the Act of March 3, 1925, as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572), authorizes the acceptance of contributions for the protection of private lands in or near the national forests. The major portion of the obligations is for the protection of private lands from fire. This arrangement helps both parties since there are millions of acres of private forest land intermingled with Federal ownership on the national forests. The lands in private ownership are usually in small tracts. It would be uneconomical for the owner to set up a fire control organization for the protection of his land. The advantage to the Government is that in many cases it would be necessary to suppress the fires on the private land without reimbursement in order to protect the adjoining Federal land.

4. Sale Area Betterment (including reforestation):

   Under Section 3 of the Act of June 9, 1930 (16 U.S.C. 576b) funds are collected from timber sale operators to insure establishment, after cutting, of a new crop and to take special measures to improve the quality of the future crop of timber. Such expenditures are essential to maintain productivity on many sale areas and to insure marketability of the next stand of timber. These funds are used on the areas cut over by timber purchasers.

The average collection in fiscal year 1958 was $1.38 per thousand board feet cut on the national forests. In the Lake States region, the amount collected is used largely for reforestation to supplement and improve natural regeneration on the cutover areas. In the South, a major problem is to control inferior hardwoods and thereby maintain a balance between desirable hardwoods and pine on the highly productive pine-producing land and most of the amount collected is used for removing worthless trees which otherwise would crowd out seedlings of desirable species, either hardwood or pine, on cutover areas.

During fiscal year 1959, obligations for sale area betterment work on all national forests totaled approximately $10.2 million.

Accomplishments for this program are reported under the Forest Land Management subappropriation along with accomplishments for reforestation and stand improvement for that subappropriation.

5. Scaling:

Under provisions of the Act of April 24, 1950 (16 U.S.C. 572) and of Section 210 of the Act of September 21, 1944 (16 U.S.C. 572a) acceptance of deposits from timber purchasers for cooperative scaling service is authorized. Such arrangements are established only when requested by the operator and when the operator pays the extra cost of such services.

6. Research Investigations:

The Acts of June 30, 1914 and May 22, 1928 authorize the acceptance of deposits for forestry research. Deposits are received from State and other public agencies, and from industrial, association, and other private agencies to finance research projects of mutual interest and benefit to both parties. The deposits may be made either in a single sum or on a continuing basis, and may either partially or wholly cover the cost of the research. The cooperative research projects may involve any aspect of forestry and varies widely as to scope and duration. A very common example of such cooperation is for a State to make a deposit to the cooperative work fund in order to intensify or to speed up completion of a comprehensive survey of the forest resources of the State. Other examples are State contributions toward forest fire research. The results of such cooperative investigations are made available to the general public as well as to the depositor.

7. Administration of Private Lands:

The Act of March 3, 1925, as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for the management of private lands. These contributions are made by private owners having land intermingled with or adjacent to national forests who wish these lands managed in accordance with good forest management practices. Their holdings are usually too small to warrant the employment of professional foresters to administer such tracts. The advantages to the Government include the avoidance of possible high fire hazard areas resulting from improper cutting practices, the elimination of the necessity of precisely marking the boundaries of the private land, and additional private forest land handled under proper forest practices.

8. Reforestation (private lands):

The Act of March 3, 1925, as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for reforestation of private lands situated within or near a national forest. This work is limited to areas of private land within a planting project on the national forests or to areas in which certain civic and other public-spirited organizations have taken an interest.

9. Statement on Utilization of Funds:

Following is a statement of funds received and obligated and balances available by major activities:

COOPERATIVE WORK, FOREST SERVICE

Trust Fund

Project	Balance Available June 30, 1958	Actual fiscal year 1959			Estimate fiscal year 1960			Estimate fiscal year 1961		
		Funds Received	Obligations	Balance	Funds Received	Obligations	Balance	Funds Received	Obligations	Balance
1. Construction and maintenance of roads and trails	$679,058	$1,318,216	$1,200,676	$796,598	$1,300,000	$1,300,000	$796,598	$1,300,000	$1,300,000	$796,598
2. Construction and maintenance of other improvements	220,974	515,753	432,024	304,703	400,000	400,000	304,703	400,000	400,000	304,703
3. Protection on national forests and adjacent private land:										
(a) Fire	294,974	1,376,043	1,398,408	272,609	1,400,000	1,400,000	272,609	1,400,000	1,400,000	272,609
(b) Other	716,707	1,080,817	958,225	839,299	1,000,000	1,000,000	839,299	1,000,000	1,000,000	839,299
4. Sale area betterment (including reforestation)	11,082,891	11,444,937	10,205,361	12,322,467	12,800,000	11,800,000	13,322,467	13,300,000	12,300,000	14,322,467
5. Scaling of timber	159,214	494,166	457,090	196,290	440,000	440,000	196,290	440,000	440,000	196,290
6. Research investigations	265,739	1,009,755	973,188	302,306	1,000,000	1,000,000	302,306	1,000,000	1,000,000	302,306
7. Administration of private lands	20,545	52,586	60,737	12,394	60,000	60,000	12,394	60,000	60,000	12,394
8. Reforestation (private lands)	95,826	114,501	98,018	112,309	100,000	100,000	112,309	100,000	100,000	112,309
Total	13,535,928	17,406,774	15,783,727	15,158,975	18,500,000	17,500,000	16,158,975	19,000,000	18,000,000	17,158,975

Note:--Balances carried forward are due primarily to necessity of deferring work for which funds are deposited until the most practicable time. For instance, funds for sale area betterment are received in advance of cutting, but work cannot be started until cutting operations are completed. The time lag sometimes extends for several years, depending on the amount of preparatory work required in the sale area, weather conditions, etc.

Above obligations for 1959 include refunds to cooperators of $116,537.

STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

(Includes only those amounts which, by November 30, 1959, were actually received or programmed for 1960 or 1961. Since work for other agencies is performed on a service basis, at the request of those agencies and for their benefit, it is not practicable to estimate in advance the amounts to be received in most cases.)

Item	Obligations, 1959	Estimated Obligations, 1960	Estimated Obligations, 1961
Allotments from:			
Watershed Protection, Soil Conservation Service - For planning, installing improvement measures, and investigations in river basins in connection with watershed protection activities	$694,622	$1,111,000	$1,050,000
Flood Prevention, Soil Conservation Service - For measures primarily for flood prevention (works of improvement)	2,223,741	2,280,923	1,735,000
Great Plains Conservation Program, Soil Conservation Service - For research services, advice and guidance to agencies conducting nursery production and tree planting phases of the Great Plains Conservation Program	29,922	32,000	32,000
Agricultural Conservation Program Service - For cooperation in administering the naval stores program	129,621	131,110	131,840
Conservation Reserve Program, Commodity Stabilization Service - For assistance in the conservation reserve program, primarily for expansion of production of tree seedlings	2,506,852	1,635,000	1,[illegible],000
Total allotments	5,584,758	5,190,033	3,[illegible],840

(Continued on next page)

Item	Obligations, 1959	Estimated Obligations, 1960	Estimated Obligations, 1961
Allocations (Advanced from other Agencies):			
International Cooperation Administration - For economic and technical assistance programs	190,716	223,842	- -
Department of the Army - For relocation and replacement of Forest Service facilities necessitated by development of Dams and reservoirs	19,584	4,839	- -
Office of Civil and Defense Mobilization:			
For rural fire defense program	- -	15,000	- -
For radiological defense training	- -	15,000	25,000
Total, Office of Civil and Defense Mobilization	- -	30,000	25,000
Total Allocations	210,300	258,681	25,000
Trust Funds:			
Cooperative Work, Forest Service:			
Trust funds deposited by cooperators for the accomplishment of certain projects which are of mutual benefit to the Forest Service and such cooperators as follows:			
1. Construction and maintenance of roads and trails	1,200,676	1,300,000	1,300,000
2. Construction and maintenance of other improvements	432,024	400,000	400,000
3. Protection of national forests and adjacent private land	2,356,633	2,400,000	2,400,000
4. Sale-area betterment	10,205,361	11,800,000	12,300,000
5. Scaling of timber	457,090	440,000	440,000
6. Research investigations	973,188	1,000,000	1,000,000
7. Administration	60,737	60,000	60,000
8. Reforestation	98,018	100,000	100,000
Total, Cooperative Work	15,783,727	17,500,000	18,000,000
Miscellaneous Contributed Funds (principally cooperative work on blister rust control)	11,843	5,571	- -

(Continued on next page)

Item	Obligations, 1959	Estimated Obligations, 1960	Estimated Obligations, 1961
Trust Funds (Continued):			
Technical Services and Other Assistance, Agricultural Conservation Program - For technical assistance in formulating and carrying out the forestry portion of the agricultural conservation cost-sharing programs in participating counties	4,360	- -	- -
Total, Trust Funds	15,799,930	17,505,571	18,000,000
Obligations under Reimbursements from Governmental and Other Sources:			
Forest protection and utilization a/	4,240,376	5,100,000	5,100,000
Forest roads and trails and Roads and trails for States b/	789,962	2,000,000	2,000,000
All other	30,091	130,000	130,000
Total, Reimbursements	5,060,429	7,230,000	7,230,000
TOTAL, OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS	26,655,417	30,184,285	29,238,840

a/ Primarily from other Government agencies, States, and counties, for forest fire protection and suppression, insect and disease control, forest research, investigations at Forest Products Laboratory, surveys, land appraisals, mapping, cruising timber, preparation of timber management plans, snow scale readings, and other miscellaneous services.

b/ Primarily road construction for U. S. Army.

NOTE--In addition, foreign currencies are available under Section 104(k) of Public Law 480 for forest research projects abroad. This work is conducted by the Agricultural Research Service of the Department of Agriculture with the assistance of the Forest Service in the review and appraisal of forest research projects undertaken abroad. The dollar expenses of the Forest Service in connection with this work are paid from the appropriation "Forest protection and utilization."

PASSENGER MOTOR VEHICLES AND AIRCRAFT

Replacement of passenger motor vehicles

During fiscal 1961 it is proposed to replace 98 passenger cars, 10 of which are station wagons, and all of which will meet replacement standards.

Based on the planned schedule of replacements, the Forest Service will have a total of 629 passenger vehicles, exclusive of 4 busses, in fiscal 1961. On analysis of vehicle use and age pattern, it is expected that 100 units will meet or exceed replacement standards before replacements are received.

As of June 30, 1959, the age and mileage classes of the Forest Service passenger motor vehicles were:

Age Data		Mileage Data	
Year Model	No. of vehicles	Lifetime Mileage	No. of Vehicles
1954 or older	41	80,000 to 100,000	2
1955	116	60,000 to 80,000	38
1956	143	40,000 to 60,000	203
1957	125	20,000 to 40,000	190
1958	129	0 to 20,000	196
1959	75		
Total	629		629

Use of Vehicles

Passenger motor vehicles are used by (1) forest officers in the protection, utilization, management, and development of the national forests and land, utilization projects and in the program for control of forest pests; (2) research technicians on experimental forests and ranges, on field research projects and forest surveys; (3) foresters engaged in carrying out the laws providing for State and private forestry cooperation; and (4) regional office field-going administrative officers in performing, directing, and inspecting field work.

The Forest Service is essentially a field organization and its passenger motor vehicles are located mainly at regional, national forest, and ranger district headquarters, land utilization projects, and experimental forests and ranges. There are over 232 million acres within the exterior boundaries of the national forests and land utilization projects. About 435 million acres of State and private forest land are included within the areas which benefit from Federal participation in the cooperative forest program. Much of this area is without common carrier service, and most forest areas and research centers are remote from commercial travel routes, requiring extensive use of motor vehicles as a means of transportation. The major portion of transportation needs, particularly at forest regional and supervisor levels and at other larger headquarters, involves multiple passenger use and can be more expeditiously and economically met by use of sedans and station wagons than by other types of vehicles.

Justification of Replacements

Dependability of passenger vehicles is an important factor in keeping work programs on schedule and in meeting emergencies. Vehicle breakdowns while on field travel cause disruptions and delays in field work as well as loss of effective work time of employees. The continued use of over-age equipment is undesirable from a safety standpoint since most of it is operated over rough narrow winding roads in mountainous country under adverse conditions. This use results in excessive operating and repair expenses when vehicles reach or exceed replacement standards.

In order to maintain passenger cars in a safe and satisfactory operating condition, it is the policy of the Forest Service to schedule periodic preventive maintenance inspections, services, and tune-ups to reduce the necessity for costly major repairs and overhauls, and to minimize lost time resulting from field breakdowns.

It is desirable to maintain a reasonable balance in the age class of the passenger vehicle inventory. The age class distribution is based upon conforming with replacement standards which recognize that some units will be retired under the age standard and others under the use standard. Prescribed replacement standards, although applicable, are not always appropriate for all Forest Service vehicles because of the wide range of operating conditions and the comparatively short field season in many of the national forests at higher elevations. Decision on replacement of passenger vehicles which reach replacement age is based on an appraisal of each unit. This involves a review of the history card combined with a mechanical inspection of the vehicle's condition and repair liability. When such appraisal indicates that the vehicle is satisfactory for further service without unreasonable repair expenditures, it is retained and assigned to lighter work, even though such action tends to upset the age standards for the fleet inventory.

In addition to appraising the condition of vehicles selected for replacement, the Forest Service analyzes current work plans and programs in determining replacement needs. This analysis includes a careful study of the number of vehicles needed at each field station, using as a guiding principle the ownership of only the minimum number of dependable units required to serve programs for which funds are budgeted.

The vehicles selected for replacement are those which it has been determined cannot be operated another season without excessive repair expense. They are unsatisfactory for further use both as to safety and mechanical condition.

The passenger car replacements requested for F.Y. 1961 exceed the number requested in F.Y. 1960 by 23 units. This is caused by a changing age pattern in the fleet structure due to increased vehicle use resulting from expanding activities primarily in timber sales, research, and public use of national forest recreational facilities. More vehicles are expected to reach or exceed prescribed replacement standards in F.Y. 1961 than in F.Y. 1960. The increased authorization to a total of 98 units compared with 75 in F.Y. 1960 is still below the normal annual replacement standards prescribed by General Services Administration.

Essentially all passenger vehicles are pooled for use by all activities with

replacement of pooled units financed from a Working Capital Fund. All appropriations reimburse this fund in ratio to use of vehicles on activities financed by the respective appropriations.

Replacement and Addition of Aircraft

The 1961 estimates propose replacement of two airplanes and addition of two aircraft. The Forest Service currently has 42 aircraft:

14 light reconnaissance airplanes
11 medium and heavy cargo and transport airplanes
(9 medium; 2 heavy)
2 forest spray airplanes (Stearman and TBM)
1 helicopter
5 torpedo bomber airplanes (TBM)
9 T-34B lead airplanes (2 place scout)

The reconnaissance and transport airplanes are used primarily to transport administrative personnel, firefighters, smokejumpers, equipment and supplies to remote and inaccessible areas where commercial service is inadequate or not available for detection and suppression of forest fires. They are used to locate and survey timber stand and vegetation conditions such as insect infestations, blowdown, diseased areas and undesirable species, and to appraise resources and damage and evaluate effectiveness of control.

The helicopter is used for training forest personnel and for experimental development on techniques and equipment for direct tactical suppression of forest fires.

The Gruman (TBM) bombers are used as air tankers for bulk dropping of retardants on forest fires.

The nine T-34B "lead" airplanes are used by air attach bosses to direct and control the dropping of fire retardants by the tanker airplanes.

It will be necessary to replace one reconnaissance airplane and one medium transport airplane. These aircraft have reached an age and total number of flying hours on the airframe where it is uneconomical to overhaul or modernize them to meet the airworthiness requirements of Civil Air Regulations. Forest Service aircraft are operated to a large extent over rough mountainous terrain where landing fields are poor and scarce. It is especially important that they be maintained for maximum performance and dependability.

The proposed replacement aircraft are needed to direct and control air attack on forest fires by privately-owned airtankers and helicopters, to facilitate detection patrol and reconnaissance, to conduct experiments and field tests of new aerial attack devices and techniques, and to transport smokejumpers, firefighters, equipment and supplies in remote areas where airplane services of commercial operators are inadequate or unavailable. In addition, they are needed for locating, surveying and appraising resources, damages and effectiveness of control.

The two additional aircraft requested will be a helicopter and a medium cargo and personnel transport airplane. The need for these additions results from

the rapid increase in use of aircraft primarily for fire suppression, unsuitability of Forest Service work for performance by commercial aircraft, and recent developments in the use of aircraft.

The helicopter will be used for further experimental development of techniques and equipment for air attack on forest fires. Better performance and load capacity of helicopters at high altitudes has increased their potential for forest fire suppression use. Typical developments are:

Helipumper. A pumping unit carried in or attached under the helicopter. It may be dropped for ground use or operated from the air as conditions require.

Hose laying. A hose tray is attached under the helicopter in such a manner that the hose may be laid quickly over terrain inaccessible to surface vehicles.

Helitanker. A collapsible tank suspended under the helicopter to carry and drop fire retardants.

Helijumping. Trained men, wearing protective clothing and having fire fighting equipment similar to a smokejumper, jump without parachute from a slow moving helicopter at altitudes up to 12 feet above the terrain in areas where the helicopter cannot land.

The medium cargo and transport airplane will be used primarily for dropping smokejumpers and paracargo. Increased use of jumpers and rapid retrieving of them by helicopter for additional jumps requires an additional airplane of this type.

Continued development and improvement of these new uses require special equipment, accessories, modification of aircraft, and new techniques and procedures. This is essential for safety and operational efficiency.

Commercial aircraft services may not be available when needed, or may not be equipped with the needed specialized equipment, or may be inadequate to meet special requirements. Since Forest Service use is seasonal, commercial operators must usually depend on other sources for their principal income. Consequently few private owners have the right type of aircraft or are able to modify them for special fire fighting service. It is necessary, therefore, to depend primarily on government-owned equipment to meet the special services which the government-owned fleet is planned to provide.